DRAFT

RI/FS SUMMARY REPORT
CPS/MADISON
SUPERFUND SITE

SUBMITTED BY

Ciba

SUBMITTED TO

EPA
United States Environmental Protection Agency

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Corporate Remediation
Toms River, New Jersey
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1.0 INTRODUCTION

On October 6, 2005 the Environmental Protection Agency and Ciba Specialty Chemicals executed an Administrative Order on Consent for the CPS/Madison Superfund site. In accordance with the Statement of Work, within thirty (30) days of the effective date, Ciba shall submit to the EPA a summary report detailing the Remedial Investigation activities to date.

This summary report documents historical (Sections 2, 3, 4) as well as more recent investigatory and remedial activities (Sections 5, 6, 7) conducted by Ciba. However, it is important to note, that as a direct result of the ACO, Ciba is newly responsible for characterization of the Madison Industries metals contaminated groundwater plume. Because Ciba has only limited information on the scope and deliverables of Madison RI work product to date, the bulk of this summary report only summarizes CPS activity. However, a summary of our current understanding of the Madison contribution to the groundwater plume is contained in Section 7.

Ciba Specialty Chemicals Inc. acquired responsibility for the CPS Chemical Company Old Bridge Facility in March 1998 as part of their acquisition of Allied Colloids. The site has a long and well documented regulatory and operational history and for the purposes of this report will continue to be referred to as the CPS site.

In October 1992, CPS Chemical Company, Inc. (CPS) and the New Jersey Department of Environmental Protection (NJDEP) executed an Administrative Consent Order (ACO) requiring CPS to perform a remedial investigation (RI) and feasibility study (FS) at the CPS facility in Old Bridge, New Jersey, in accordance with and New Jersey Technical Requirements for Site Remediation. (NJAC 7:26E, 1997) and the United States Environmental Protection Agency's (USEPA) "Guidance for Conducting Remedial Investigations and Feasibility Studies Under CERCLA" (USEPA, 1988). Previously, other studies and actions were court ordered and for the most part are not summarized in this report. The CPS RI was completed in three phases (Phase I(1993), Phase II(1995) and Phase III(1996)) and approved by the NJDEP. As a result of the RI, contaminated soils and ground water were delineated, and an interim ground water recovery system was installed and began operation in March 1996. Since their inception, these remediation measures have significantly reduced groundwater contaminant concentrations in the production source area and in the downgradient groundwater plume. On-going optimization of the groundwater recovery system continues and a Feasibility Study was submitted to the NJDDEP and USEPA during 2001. Manufacturing activity was terminated at the site on December 14, 2001. In October 2003, the state requested that EPA take the lead for the CPS/Madison site.

1.1 Purpose

This report presents a brief history of the site and a summary of the studies conducted at the CPS site and is based on information and data presented in various site characterization reports. The primary references used in compiling this report are listed in the references section.

1.2 Organization of Report

The report is organized into the following sections:

Section 2.0 presents relevant background information, including the Facility description, history of manufacturing activities, and the regulatory history associated with regional groundwater use and the Interim Remedial Measures currently in place.

Section 3.0 presents the site characterization, which describes the nature and extent of contamination at the Site. This section includes a summary of the site geology and hydrogeology, the contaminant distribution within the aquifer and the identified source area. The characterization is based on historical Phase I and Phase II RI data.

Section 4.0 describes supplemental studies associated with the RI. These studies include recommendations from the Phase II RI as well as a Baseline Human Health Risk Assessment which aided in development of remedial action objectives for the Feasibility Study, which provide specific goals for protecting human health and the environment.

Section 5.0 details the Interim Remedial Measures conducted at the site as well as the current status of the Performance Monitoring Program

Section 6.0 details post RI investigations and reports including a Monitored Natural Attenuation study and surface water sampling in preparation for the completion of the Feasibility Study.

Section 7.0 details projects currently underway at the site including: preparation of a groundwater plume map delineating CPS/ Madison/ Evor Phillips contributions, additional site source area soil sampling, and demolition of the production facilities.

2.0 BACKGROUND

2.1 Site Location and Description

The CPS site is located on Old Water Works Road in Old Bridge Township, Middlesex County, New Jersey (Figure 2-1). The site is bounded by Old Water Works Road to the west and north, undeveloped land to the south and east and the Madison Industries (Madison) metals recovery facility to the west. Several other industrial operations are found to the north and west; including the Evor Phillips Superfund site which is located approximately 200 feet north of the CPS site. The City of Perth Amboy's municipal supply well field (Runyon Well Field) lies south-southwest of the CPS site (Fig. 2-2 Supply wells).

The entire CPS property occupies 35 acres. In 1968 the process facility, which covers approximately 1.5 acres, was constructed. At that time, reinforced concrete pads were built to support individual process vessels and storage tanks. Plant operation began at the beginning of 1969. The process and traffic areas including office, labs and warehouses occupy approximately 4.5 acres.

All storage tank farms were lined with reinforced concrete and have been contained by diked walls since 1975. Piping and storage tanks are located above ground surface. During 1978-

1979, the entire 4.5 acres was graded and covered with concrete, soil cement and asphalt overlay to help prevent infiltration from accidental spills into the subsurface soils. A containment curb surrounds the entire processing plant work and traffic areas. The ground surface has been paved and sloped to a central drainage swale and sump system which discharge to the sanitary sewer.

2.2 Site History

2.2.1 Current and Historical Operations

In 1969, CPS commenced operations at the Old Bridge site. The initial business of the site was the recovery of valuable materials from off-site process by-products and residuals. In 1974, CPS began producing monomers, which are intermediates for the production of water-treatment chemicals. These intermediates are converted into polymers which aid in the coagulation and flocculation of suspended solids. Ciba acquired the business in March 1998 and continued production of water treatment chemicals until the plant ceased operations December 14, 2001.

2.2.2 Raw Materials, Hazardous Substances and Manufactured Products

Organic esters and alcohols were among the raw materials and finished products handled at the CPS facility for the production of the water treatment chemicals. Sodium hydroxide was also used in saponification and neutralization reactions at the site. The raw material and product streams at the CPS facility were generally alkaline.

The following hazardous constituents, as defined by 40 CFR 261, App. VIII, were used by CPS: allyl alcohol, ethanol, dimethyl sulfate, methyl chloride (chloromethane) and methyl methacrylate.

Liquid RCRA hazardous wastes generated by production processes were stored in less than 90 day accumulation tanks and transported off-site in bulk carriers for fuels blending.

2.2.3 Regional Ground Water Use and Conditions

The City of Perth Amboy operates the Runyon Well Field, located approximately 3,000 feet south-southwest of the CPS facility (Figure 2-2 Supply wells). Current withdrawal is from four wells, each screened in the Old Bridge Sand at depths ranging from 55 to 77 feet below ground surface (BGS). Individual well yields range from 500 to 1,000 gallons per minute (gpm), and total pumpage is approximately 2-3 million gallons per day (MGD).

2.2.4 Historical Ground Water Contamination in Perth Amboy Well Field

Pricketts and Tennent Ponds were created to enhance ground water recharge to the Perth Amboy supply wells. In the 1920s, a dam was constructed on Tennent Brook, creating Tennent Pond. In 1972, a dam was also constructed across Pricketts Brook, creating Pricketts Pond.

In the early 1970s, the Bennet Suction Line served as a potable water source for the City of Perth Amboy. This line of approximately 30 shallow wells connected by a common manifold was located southwest of the CPS and adjacent Madison sites. The well depths ranged between 35 and 55 ft-bgs.

In 1971 and 1973, metals were detected in the Bennet Suction Line wells. In March 1971, suction line wells Nos. 1 through 6 were abandoned. In March 1973, Perth Amboy discontinued use of the remaining wells. To replace potable water once supplied by the suction line, supply wells of approximately 55 to 77 feet in depth were installed north of Tennent Pond (wells 5,6,7,8).

In October 1981, CPS and Madison Industries were ordered by the court to implement a remediation program in order to protect the Perth Amboy supply wells from volatile organic chemical and metals contamination. The scope of work included the dredging of sediments from Prickett's Pond, construction of a 5000 linear foot long cut-off slurry wall, and implementation of a 700 GPM groundwater recovery and treatment system. In response to the order, CPS and Madison developed an alternative remediation program which included;

(1) installation and operation of a ground water recovery system; (2) relocation of Pricketts Brook to a position south of the CPS property line; (3) discharge of treated effluent via the Old Bridge Municipal Utilities Authority (OBMUA) line to the Middlesex County Utilities Authority (MCUA) treatment plant; and (4) implementation of a performance monitoring program. The alternate program was approved by the NJDEP and submitted to the court in 1985.

Monitoring wells were installed between the CPS/Madison sites and the supply wells in the late 1980s. From approximately 1984 to the present, certain VOCs have been detected in monitoring wells downgradient of CPS and Madison as well as in upgradient wells. In 1990, low concentrations of benzene and chlorobenzene that exceeded the then state Maximum Concentration Limit were found in existing Perth Amboy supply well PA-6 (Figure 2-2). However, the water quality in the delivered water never exceeded the MCL.

On January 25, 1991, ground water pumping began at four recovery wells (RW-1, RW-2, RW-3 and RW-4) located downgradient of the CPS and Madison properties to remediate VOCs and metals contamination in the Old Bridge aquifer. Recovery wells RW-1 and RW-2 were installed by CPS, and wells RW-3 and RW-4 were installed by Madison (Figure2-2). The individual pumping rates at the recovery wells ranged from about 50 to 200 gpm. The greatest discharge rate of approximately 200 gpm was recorded at well RW-2. In August 1992, a fifth recovery well (RW-5) was completed by CPS 550-feet upgradient of supply well PA-6 to recover ground water with low chlorobenzene concentrations downgradient of recovery well RW-2. Madison has since installed an additional recovery well (RW-6) for control of metals contamination in ground water.

When ground water recovery was initiated in 1991, a performance monitoring program (PMP) involving quarterly ground water sampling was implemented to determine the effectiveness of recovery. Chlorobenzene concentrations in recovery well RW-2, the principal well intercepting the VOC plume, ranged from 300 to 450 parts ppb during the first year and declined during the second and subsequent years.

As a result of the operation of recovery wells RW-2 and RW-5, there has been a significant overall decline of VOC concentrations within the groundwater plume. In June 1995, CPS petitioned the NJDEP to terminate operation of recovery well RW-5 due to the decreasing contaminant concentrations in the area adjacent to the Runyon Well Field. The request was granted in July 1995 (pumping in RW-1, had been terminated earlier due to low levels of contaminants). A similar request was granted in 1999 to allow the shutdown of RW-2, however CPS PMP monitoring continues.

Madison is currently operating other recovery wells to intercept metals-contaminated ground water emanating from the Madison facility (pumping wells RW-3/RW-4 were removed from service in favor of these new wells).

Additional detail on the history of CPS/Madison pump-and-treat as well as a discussion of water quality trends at the pumping wells is provided in Section 7.1.

2.2.5 On-Site Interim Remedial Measures

An on-site interim ground water recovery and treatment system began operation in March of 1996 in response to identification of Tank Farm # 5 area as the major source of elevated levels of VOCs in the groundwater. At a combined pumping rate of 30 gpm, wells CPS-3A/WE-2RA are intended to capture contaminant mass flux from the delineated source area (see Section 5).

Since inception of pumping in March 1996, source area VOC concentrations have declined from more than 18 ppm to less than 4 ppm in groundwater (Figure 2-4). Downgradient of the source area in the Runyon Well Field, VOC concentrations have also declined , and all downgradient CPS recovery wells have ceased operation (RW-1, RW-2, RW-5).

Madison Industries continues to operate extraction wells in order to mitigate metals contamination in groundwater. The effectiveness of the interim remedial measures is assessed in Section 7.1.

3.0 SITE CHARACTERIZATION

3.1 Natural Setting

Regional topography around the CPS site is relatively flat with little natural relief. The land surface elevation is approximately 25 feet above mean sea level (ft-msl). Local topography slopes gently to the south and southwest, towards Pricketts and Tennent Ponds (Fig. 2-1)

A soil survey was not performed by the New Jersey District of the Soil Conservation Service for Middlesex County. According to Tedrow (1986), soils in the vicinity of the CPS site are part of the Galestown Series, a somewhat excessively-drained soil of relatively coarse- to very fine-grained sands, formed on deep, loose, sandy sediments. In some locations, the sandy mantle is thick, but in others it is thin to nearly nonexistent.

During precipitation events, the precipitation is quickly recharged to ground water. Vegetation is sparse, soils are permeable, and the ground surface is relatively flat in areas surrounding the CPS facility. Storm water run off discharges to Pricketts Brook, a tributary of the Tennent Brook which eventually discharges to the South River. In 1972, Pricketts Brook was diverted from transecting the CPS site through construction of an artificial stream channel around the CPS facility's southern property line. Pricketts Brook, which is often dry, flows intermittently to the southwest and discharges at the northeastern end of Pricketts Pond, which was built to retain surface water runoff and recharge the local aquifer.

3.2 Hydrogeologic Conditions

3.2.1 Geology

The CPS site lies in the northeastern part of the Coastal Plain Physiographic Province which consists of a large, regional wedge of unconsolidated and poorly-consolidated sands, gravels, silts and clays. The thickness of this sediment wedge and the depth to bedrock increase to the southeast. According to Zapecza (1984), the depth to the top of bedrock near the CPS site is approximately 270 to 300 ft-bgs.

At the CPS site, the Old Bridge Sand, a member of the Cretaceous-age Raritan Formation, occurs from just below ground surface to 55 ft-bgs. The Old Bridge Sand is primarily a fine- to coarse-grained, well-sorted sand with occasional, discontinuous, thin beds of clay. Locally, a veneer of the Quaternary-age Cape May Formation overlies the Old Bridge Sand. The two units are lithologically similar and are in direct hydraulic connection.

The Old Bridge Sand is underlain by the South Amboy Fire Clay. Where present, the South Amboy Fire Clay is found at a depth varying from 55 to 85 ft-bgs. Wehran Engineering (1986) found the clay to be thin or absent beneath portions of the CPS and Madison sites. Underlying the South Amboy Fire Clay is a thin layer of the Sayreville Sand which has a composition similar to the Old Bridge Sand. The laterally continuous Woodbridge Clay with an average thickness of about 100 feet lies beneath the Sayreville Sand and is an aquitard that separates the Old Bridge Sand from the underlying Farrington Sand aquifer. The underlying Farrington Sand is a fine- to medium-grained unit of variable thickness. Geologic cross-sections of the "shallow and intermediate zones" beneath the CPS site are provided as Figures 3-1A, 3-1B, 3-1C.

3.2.2 Hydrogeology

The Cape May, Old Bridge and Sayreville Sand units comprise the Old Bridge water-table aquifer at the CPS facility and the Runyon Well Field. The South Amboy Fire Clay is an aquitard existing within the Old Bridge aquifer, but is not laterally continuous. The Woodbridge Clay, a continuous confining unit with a thickness of about 100 feet, separates the Old Bridge Sand and Farrington Sand aquifers (Appel, 1962). The Farrington Sand is also a major regional aquifer.

Based on local aquifer pumping tests (Weston, 1992; Wehran, 1990; Pucci and others, 1989), the average hydraulic conductivity (K) of the Old Bridge aquifer in the vicinity of the CPS site ranges from approximately 74 to 100 feet/day, and the effective porosity is approximately 40 percent (Barksdale, 1943 and Hasan, et. al. 1969). Storage values range from 0.02 to 0.05, which are typical for unconfined aquifers containing clay layers.

Ground water levels are shallow, encountered from approximately 6 to 10 ft-bgs in monitoring wells located on and downgradient of the CPS site. Water level fluctuations are coincident with precipitation events due to the permeable recharge characteristics of the ground surface.

Ground water elevation contours indicate a southwest flow direction under both static and pumping conditions. The hydraulic gradient of the water table appears to be consistent and relatively flat at an average value of 0.004 foot/foot. Water table levels measured adjacent to Pricketts Pond indicate that ground water from the north discharges into the pond; to the south the pond appears to recharge the aquifer.

Based on ground water data collected at the CPS site, the flow direction and hydraulic gradient are similar to the regional values.

Additional details on Site hydrogeology are provided in Section 7.1.

3.3 Nature and Extent of Contamination

The nature and extent of contamination have been described in detail in the Phase I and Phase II RI reports (DRAI 1994; 1996). This section provides a summary of impacts to soil and ground water quality. The Phase I and Phase II RI data tables are included here as Appendix 1, and the QA/QC requirements for the RI investigation are included here as Appendix II.

The RI Work plan for the site identified five (5) on-site and three (3) off-site areas of environmental concern (AOC) (Fig. 3.2). The on-site areas included; hotbox processing unit (AOC-1), hazardous waste drum storage area (AOC-2), storm water sewer line in the former channel of Pricketts Brook (AOC-3), former route of Pricketts Brook (AOC-4) and main plant processing area (AOC-5). The results of the Phase I and Phase II soils and soil gas sampling identified AOC -5 (Tank Farms 1-5) as exhibiting elevated levels of VOC contamination and exceedances of the New Jersey Impact to Groundwater Soil Cleanup Criteria . The Phase III soil sampling further delineated the area of contamination within AOC-5 (Fig. 3-3). Based on these findings, the Interim Remedial Measures described in Section 5 were implemented.

The three off-site areas investigated included soils outside the main plant processing area, soils around monitoring well EPA-4 and the bed of Pricketts Brook downgradient of the CPS site.

3.3.1 Soil

Soil sampling and analysis were conducted during the three phases of the RI. Overall, soil quality has been characterized through the collection and analysis of approximately 117 soil samples and 84 soil gas results. Analytical parameters included VOCs, base/neutral and acid extractable organic compounds (BNAs) and Priority Pollutant (PP) or Target Analyte List (TAL) metals. The soil sample results were compared with the NJDEP "Impact to Ground Water Soil Cleanup Criteria" (IGWSCC) due to the shallow depth to water at the site (about 6 to 10 feet) and the NJDEP ingestion-based "Residential Direct Contact Soil Cleanup Criteria" (RDCSCC). The IGWSCC are more stringent than the RDCSCC for 90 % of the VOCs listed in the NJDEP's February 3, 1994 Soil Cleanup Criteria (SCC). The majority of contaminants were detected in the Tank Farm area (AOC 5) beneath the extensive site cover (reinforced concrete pads, soil cement, asphalt). The contaminant levels existing below the cover indicate that the spills occurred prior to the construction of the cover, during the earliest period of operations at the CPS site (solvent and materials recovery). Due to the ongoing plant production activities, no samples were able to be collected from under existing tank farms and other process equipment in AOC 5 during the RI , thus limiting further delineation of the source area. As discussed in Section 7.2, since plant closure in 2001, samples have been obtained from under the concrete in Tank Farms 4 and 5 as part of ongoing source area characterization efforts.

Phase I and II sampling identified chlorobenzene and total xylenes, at concentrations above the IGWSCC, at eight sampling locations. Seven of the eight locations are within the main processing area (Fig. 3-3). The depth at which these VOCs were detected ranged from 2 to 8 ft-bgs. The chlorobenzene concentrations ranged from 1,100 to 6,600 ppb and total xylenes from 23,000 to 65,000 ppb (Table 3-1). These levels are within one order of magnitude of the IGWSCC, and are below the RDCSCC.

Methylene chloride, chlorobenzene, various dichlorobenzenes, benzene, toluene, ethylbenzene and xylenes were found at low concentrations (below the IGSWCC) in most of the Phase II RI soil samples.

With regard to metals-contaminated soil on CPS property, with the exception of two surface and two subsurface samples, all soil results were below the RDCSCC. Cadmium exceedances were detected in two surface soil samples at 2.3 and 2.9 ppm, and in two subsurface samples at 1.1 and 1.2 ppm. The RDCSCC established by the NJDEP in 1994 for cadmium was 1 ppm. Recently, the NJDEP has evaluated new USEPA toxicity data for cadmium and is accepting site-specific RDCSCC for cadmium in the range of 39 to 78 ppm. Therefore, the cadmium concentrations are significantly below any level of concern. The Non-Residential Direct Contact Soil Cleanup Criterion (NDCSCC) for cadmium is 100 ppm. Metals contamination is not site-related but rather is a result of airborne deposition, or can be attributed to the naturally high background levels documented in the RI report and discussed in the Human Health Risk Assessment (Section 4.3).

Analysis of soils outside the main processing area revealed limited VOC contamination with minimal impact to groundwater. As previously discussed, the source area was identified within the main Tank Farm area and Interim Remedial Measures were implemented.

3.3.2 Aquifer Characterization

Ground water samples were collected from eight (8) existing monitoring wells during the Phase I RI and ten (10) monitoring wells during the Phase II RI for VOCs and Priority Pollutant metals analyses. Wells WE-2, WE-2R, CPS-1 and CPS-3 contained significant VOC levels, with some concentrations of the following parameters 1 to 3 orders of magnitude above the NJDEP Class II-A ground water quality standards: acetone; benzene; chlorobenzene; 1,2-dichlorobenzene; 1,3-dichlorobenzene; 1,4-dichlorobenzene; 1,2-dichloroethane; trans-1,2-dichloroethylene; methylene chloride; toluene; 1,1,2-trichloroethane; 1,1,2,2-tetrachloroethane; trichloroethylene; vinyl chloride and total xylenes .

The ground water component of the Phase II RI included the use of the hydropunch sampling method to delineate the elevated VOC levels observed in well WE-2. The results of the hydropunch sampling revealed a VOC contaminants within the main process area, specifically, beneath Tank farms 1 through 5 (Figure 3-3). Vertical delineation showed the VOC contamination limited to a depth interval extending from the water table to approximately 40 ft-bgs.

Based on the RI data, elevated VOC concentrations appear to be limited to the main process area of the CPS site. Hydropunch and ground water sampling have isolated the area of elevated VOC concentrations to the southern portion of the main process area and Tank Farms 1 through 5. The width of the area of elevated VOC concentrations was estimated to be approximately 140 feet. The aerial extent of the area of elevated VOC concentrations is shown on Figure 3-3.

3.3.3 Plume Characterization- Delineation of Ground Water Contamination Downgradient of the CPS Facility

The area of elevated VOC concentrations at the former CPS tank farm area is identified as the source for the downgradient VOC plume. Based on the results presented in PMP report

53/54 (2004), contaminant levels exceeding NJ GWQS extend from the source area to monitoring well WCC-16VS, which is approximately 1,200 feet downgradient. There have been occasional exceedances of MCLs at low concentrations in monitoring wells downgradient of WCC-16VS. For example, in June 2002 at DW-14 (575 feet upgradient of PA-6), benzene was detected at 1.1 ppb (MCL = 1.0 ppb). The width of the contaminant plume generally varies between 200 and 400 feet.

The extent and shape of the downgradient contaminant plume is consistent with the general ground water flow direction at the former CPS site and the Runyon Well Field. Ground water leaving the former CPS site flows southwest. From the vicinity of RW-2, ground water flows southerly toward the Perth Amboy supply wells.

The VOC compounds found downgradient of the CPS/Madison site are similar to the suite of compounds found at the former CPS facility source area but are generally detected at lower concentrations. The number of VOC compounds exceeding the NJDEP Class II-A standards downgradient of the site is reduced to 3 from a total of 12 compounds that exceed NJ GWQS in the vicinity of the source area. Since 1991, the contaminant concentrations in and the size of the plume have decreased as a result of the operation of the recovery wells and natural attenuation processes. A summary of the current VOC exceedances found in the plume is provided in Figure 3.4 and historical values shown in Table 3-2.

A more detailed discussion of plume characterization is provided in Section 7.1.

3.4 Classification Exemption Area

As required by the NJDEP a Classification Exemption Area (CEA) must designate areas of the Old Bridge Aquifer where water quality standards are not met, and must remain until concentrations are reduced below the applicable New Jersey groundwater quality standards(GWQS). On July 7, 1998 a CEA analysis was submitted to and approved by the NJDEP. The current CEA is depicted in Figure 3.5

3.5 Surface Water and Sediments

The natural surface drainage for the area flows to Pricketts Brook, a tributary of Tennent Brook which eventually discharges to the South River (Figure 2-1). Pricketts Brooks flows intermittently to the southwest and discharges at the northeastern end of the man-made Pricketts Pond. Composed of course-grained sand, the stream channel is within the Old Bridge Sand aquifer. In 1972, Pricketts Brook was diverted from transecting the CPS facility when an artificial stream channel was constructed around the CPS southern property line.

In the 1920s a dam was constructed on Tennent Brook, creating Tennent Pond. Based on review of aerial photographs, a dam was built across Pricketts Brook in the early 1970's creating Pricketts Pond. Both Pricketts and Tennent Pond were constructed to enhance groundwater recharge to the Runyon Well Field.

Surface water is present only intermittently in Pricketts Pond and Pricketts Brook following precipitation events. Neither the pond nor the brook is used for recreational purposes.

A total of 89 sediment samples were collected by Wehran Engineering in 1984 from Pricketts Brook and Pricketts Pond, both upgradient and downgradient of the CPS site. The samples were analyzed for 33 individual VOCs. Thirteen of the 33 VOCs were detected in the sediment samples (Wehran Engineering 1984). The most prevalent compound detected was methylene chloride. Only 9 of the eighty-nine samples contained VOC concentrations above 1 ppm. The highest total VOCs detected was reported as 2.74 ppm (Table 3-4). During 1992 10 samples from four (4) locations were collected from the bed of Pricketts Brook, west of Madison Industries. Only acetone was detected, and concentrations were less than 1 ppm in all of the samples collected.

4.0 Supplemental Studies and Reports

4.1 Phase III Soil Sampling Results

Following recommendations outlined in the "Results of the Phase II RI" report, three soil borings were collected from beneath the concrete in the CPS production area utilizing a Geoprobe rig. The three borings were located in a line between the tank farm area and the manufacturing area. The purpose of the borings was to evaluate the soil quality within the unsaturated zone.

A letter report was issued to the NJDEP on July 19, 1996 detailing the results of the sampling. The analytical results for the soil samples indicated that chlorobenzene at a concentration of 3.9 ppm was the only exceedance of NJDEP's "Impact to Ground Water Soil Cleanup Criteria". The findings for this sampling event were consistent with the soils investigation conducted during the Phase I and II RI.

4.2 Aquifer Test

"Results of the Phase II RI" report (1996) recommended that an Aquifer test be conducted in the general area of wells CPS-3 and WE-2R to develop and test an effective pumping scenario that would capture source area contaminants onsite. The aquifer tests were conducted December 23, 1994 through January 6, 1995. A pilot test of an air stripper and vapor phase carbon treatment system was conducted concurrently.

Based on the information gathered before and during the aquifer test, a FLOWPATH computer model simulation was prepared and various source area pumping scenarios were tested. The model predicted a combined extraction rate of 30 GPM at wells CPS-3 and WE-2R would be sufficient to intercept source area contaminant migration and capture contaminants in the vicinity of CPS-1.

Recovery operation commenced in March 1996 to remediate volatile organic contamination at wells CPS-3 and WE-2R. Pumping rates have varied from 20-30 gpm over time. Currently, the results of the pumping are incorporated into the Performance Monitoring Program reports (see Sect. 5.0).

4.3 PUBLIC HEALTH ASSESSMENT

The Agency for Toxic Substances and Disease Registry (ASTDR) and the New Jersey Department of Health issued a Public Health Assessment for the CPS/Madison site during 1996.

The assessment concluded that:

On the basis of the information reviewed, the ATSDR and NJDOH have concluded that the CPS Chemical/Madison Industries site poses no apparent public health hazard. The available data do not indicate that humans are being exposed or have been exposed to levels of contamination that would be expected to cause adverse health effects. In addition, all of the soluble organic contamination found is within the capture zone of the existing ground water recovery system. The NJDEP has abandoned plans to recharge treated groundwater into the Runyon Watershed aquifer. This eliminates the possibility that reinjected soluble organics would contaminate the municipal water supply wells.

The Perth Amboy public water supply wells (Supply Wells #5 and #6) have been affected by contaminants from the CPS/MI site. VOC's are present in Supply Well #6; however, only chlorobenzene was detected in finished or treated water. The maximum concentration of chlorobenzene was below it's MCL of 4 ppb. Perth Amboy well #5 has been contaminated with high levels of zinc and is utilized as a backup supply and is not currently in service.

The zinc contamination in Perth Amboy Supply Well # 5 appears to have a continuing source. There is an indication that there may be more than one source of zinc contamination. The most likely sources are surface waters and sediments in Prickett's Brook and Pond.

A toxicological evaluation was conducted of a human exposure scenario of residents drinking untreated groundwater from contaminated supply wells. Potential exposure to contaminants found in the Perth Amboy municipal water supply before treatment (e.g., benzene and chlorobenzene) did not indicate estimated exposure doses where adverse health outcomes would be expected. Similarly, there was no significant increase in expected lifetime excess cancer risk calculated for residents of Perth Amboy.

Former and current workers at the CPS/MI site have probably been exposed to heavy metals through the ingestion of dusts and other small particles in the air and on work surfaces in and outside of the buildings and from VOC's from operations and previous spills. Future exposures of site workers to site contaminants are also possible.

A review of the site data indicates that, because of past and current treatment and blending of the potable water, it is unlikely that residents were exposed to VOC's at concentrations above the NJMCL's or the ATSDR comparison values for these chemicals.

A review of the most recent data concerning the remediation of the volatile organic (VOC's) contamination in the ground water, indicates that the continued operation of the recovery wells are currently providing hydraulic control of VOC's in the contaminant plume.

There is evidence of an upgradient source of contamination (VOC's and metals) that are contributing to the groundwater contamination at the CPS/MI site.

The on-site metal sludge piles were removed from the (MI) site in August 1995. Any past migration off-site (hydraulically and atmospherically) could have caused adverse impact on off-site soil and other surface media, and may have posed a potential risk of exposure to humans (residents and employees) through inhalation and dermal contact.

There are several off-site areas of stressed vegetation which appeared to receive runoff water from unimproved areas MI property via rain channels. Trespassers on these stressed areas site are unlikely to come in contact with site contaminants at levels of health concern. Further analysis into the cause of the vegetative stress is currently underway and the results will be included in the final (MI) Phase II RI Report.

A review of the cancer incidence for the municipality of Perth Amboy (1979 through 1991) found cancer rates were *not* elevated, with respect to New Jersey State rates. Full report available on-line at www.atsdr.cdc.gov/HAC/PHA/cps/cps_p1.html.

4.4 BASELINE HUMAN HEALTH RISK ASSESSMENT

A formal Baseline Human Health Risk Assessment was conducted by Ciba Specialty Chemicals and a report was submitted to the NJDEP and USEPA. Based on a comparison of soil, groundwater and sediment results from the Phase I, II and III RIs against applicable state and federal standards and guidelines, various media and constituents were identified as potential contaminants of concern.

4.4.1. Media
SOIL

Based on a comprehensive evaluation of the Phase I, II, III RI results, in accordance with USEPA RAGS (USEPA 1989a), it was concluded that with the exception of Arsenic, the CPS site soils do not represent a direct source of human health concern and therefore are not considered in the quantitative baseline risk assessment. Although Arsenic in site soils appears to be representative of naturally occurring site background levels and was only detected below the RDCSCC of 20 ppm, the NJDEP and USEPA requested that As be carried through the risk assessment based on its known human carcinigenicity and exceedance of USEPA's 0.4 ppm human health risk soil screening level. Low VOC concentrations in site soils will decrease over time and not adversely impact groundwater, and were not considered in the quantitative baseline risk assessment. A summary of the soil sampling results are presented in Table 4-I and 4-2.

Sediment

Surface water is present intermittently in Pricketts Brook and Pricketts Pond following heavy precipitation events. Neither the pond or brook is used for recreational purposes. Since the brook is predominantly dry, these sediments may be more appropriately classified as soils. Regardless of the classification, the VOC concentrations detected in the samples collected from Pricketts Pond and Pricketts Brook are below the generic human health based Soil Cleanup Criteria or Soil Screening Levels (see Table 4-4). In addition, VOCs are not known to bioconcentrate or biomagnify in the environment and no sensitive ecological receptors have been identified in the vicinity of the CPS site. Therefore sediments were not considered in the baseline risk assessment.

Ground Water

Sixteen VOCs and nine inorganic metals which were detected at levels exceeding the Ground Water Quality Standards and/or MCLs were identified as contaminants of potential concern and were carried through the quantitative risk assessment process to determine the magnitude of associated human health risk. A summary of ground water sampling results is presented in Table 4-3, and Table 4-5 lists the identified potential Contaminants of Concern

4.4.2 Potential Exposure Pathways

A potential exposure pathway of ingestion and inhalation through residential potable water use was evaluated for adults , as well as children. Additionally, an adult site worker and a future use construction worker scenario were also evaluated for exposure to site soils containing arsenic.

4.4.3 Quantification of Exposures

Evaluation of the exposure pathways described above involves estimation of the following parameters: exposure time, exposure frequency, exposure duration, inhalation and ingestion rates and contaminant concentrations.

The USEPA recommends that estimates of contaminant intake be developed to portray reasonable maximum exposure (RME) for current and future site conditions. The RME is the highest exposure that could reasonably be expected to occur for a given exposure pathway at a site and is intended to account for both uncertainty in the contaminant concentration and variability in the exposure parameters. The RME is generally well above the average case but is within the range of possibility. RME values were considered in the baseline risk assessment.

The NJDEP and USEPA also required the use of sampling results with the maximum ground water concentrations. This is an extremely conservative assumption or "worst case scenario". The maximum concentrations are shown in Table 4-6.

4.4.4 Ingestion of Ground Water

The residential exposure chronic daily intake values for ingestion of VOCs and metals in ground water were calculated from the standard USEPA RAGS (USEPA 1989a) equation and exposure assumptions provided in the USEPA's Standard Default Exposure Factors manual (USEPA, 1991b), and specific exposure values provided by USEPA Region II. The exposure concentrations and parameters and the assumptions on which they are based are shown in Table 4-6 and 4-7 and below:

$$\text{Intake(mg/kg-day)} = \frac{CWxIRxEFxED}{BwxAT}$$

CW = Maximum contaminant concentration of individual contaminant in water(mg/l)

IR = Ingestion rate at 2 liters/day (adult 90 th percentile)

Ingestion rate at 1 liter/day (child, 0-6 years old)

EF = Exposure frequency at 350 days/year

ED = Exposure duration at 24 years (adult)

Exposure duration at 6 years (child)

BW = Body weight at 70 kg (adult, average)

Body weight at 15 kg (child, average)

AT = Average time for noncarcinogenic effects at ED x 365 days/year;

For carcinogenic effects at 70 year lifetime x 365 days/year

Based on the elevated levels of VOCs and metals reported for ground water compared to regulatory benchmarks, it was evident that this exposure pathway would likely pose an unacceptable human health risk. Therefore residential exposure chronic daily intake values for ingestion of VOCs and metals in ground water were also calculated using central tendency exposure assumptions and the standard USEPA RAGS (USEPA 1989a) equation. Central tendency calculations may be required by USEPA when potential risks exceed the generally accepted ranges for hazardous sites(e.g.,10-4 to 10-6, or a hazardous quotient of 1). The central tendency calculations show, for example, how contaminant related risks would decrease when certain exposure factors are modified. Rather than focusing on 95% of a given receptor population, as is customary in the risk assessment process, the central tendency values attempt to incorporate approximately 50 % of the receptor group. Since the approach results in shorter exposure durations, the total risks also decrease. However, the exposure concentrations are not modified when applying this method. This means that the total risks do not change significantly since most of the ground water concentrations used in the assessment are several orders of magnitude above the cleanup criteria. Specific central tendency values were provided by the USEPA-Region II. The central tendency assumptions are a child (15kg body weight) consumes 0.7 liters of water per day, 350 days a year for six years, and an adult (70 kg body weight) consumes 1.4 liters of water a day for nine years. The results are shown in Table 4-8.

4.4.5 Inhalation of Airborne VOCs (Shower Scenario)

The residential exposure intake values for inhalation of vapor phase VOCs from contaminated ground water use during showering was calculated using standard equation and default assumptions (USEPA, 1991b:Schaum et al.,1992) consistent with USEPA RAGS (USEPA 1989a). The contaminant concentrations in air are calculated using a simplified approach which assumes that all VOCs of potential concern are released during showering in hot water.

Intake values for inhalation of volatile chemicals in ground water were calculated from modeled air concentrations. Possible air concentrations of volatile contaminants were estimated from a simple model which considered the bathroom as a single compartment and results in air concentration averaged over estimated shower time and subsequent time spent in the bathroom after showering (Schuam et al., 1992). The model was based on the assumption that individual contaminants volatilized at a constant rate, instantly mix uniformly with bathroom air, and that ventilation with clean air does not occur. These assumptions imply that the concentration of each contaminant in air increases linearly from zero to a maximum at the end of the shower and thereafter remains constant during the time an individual spends in the bathroom immediately after the shower. The maximum air concentration in the model was derived through extrapolation of contaminant levels in ground water. The assumptions of constant volatilization and no ventilation make this model very conservative and therefore results in an overestimation of exposure. The results are shown in Table 4-7.

4.4.6 Ingestion of Soil/ Site Worker and Future Use Construction Worker.

Based on 28 soil sample results for Arsenic ranging from non-detect to 10 ppm, the 95 percent upper confidence limit for the log normalized data is 3.1 ppm. Consistent with USEPA guidance (USEPA, 1989a), this value is above the data set average (2.3 ppm As) and the lognormal data set average (0.5 ppm) but is within the range of possibilities. Therefore the 3.1 ppm As is used as the RME concentration term for calculation of contaminant intake values for site worker and construction worker ingestion of As from site soils. The site worker occupational exposure was calculated from standard USEPA RAGS equations (USEPA, 1989a) and assumptions (USEPA 1991b). The future use construction worker exposure chronic daily intake value for ingestion of As contaminated soil were calculated from the standard USEPA RAGS (USEPA, 1989a) equation and specific exposure values provided by USEPA Region II.

Evaluation of the occupational potential exposure to contaminated soils through ingestion assumes an adult site worker (70 kg body weight) ingests 50 mg of soil per day at a concentration of 3.1 mg/kg for 250 days per year for 25 years. Evaluation of the occupational potential exposure to contaminated soils through ingestion assumes an adult construction worker (70 kg body weight) ingests 480 mg of soil per day at a concentration of 3.1 mg/kg for 65 days per year for one year. A summary of exposure assessment results for each exposure scenario is shown in Table 4-7.

4.4.7 Toxicity

Chronic reference concentration (RfC) and reference dose (RfD) values were obtained preferentially from Integrated Risk Information System (IRIS), Health Effects Assessment Summary Tables (HEAST), or through consultation with the Superfund Technical Support Center (STSC) Environmental Criteria Assessment Office (ECAO). Confidence levels for the available toxicity values are provided in Table 4-8 and 4-9 for noncarcinogenic effects. Table 4-10 presents Oral Slope Factors for potential carcinogenic effects.

4.4.8 CONCLUSIONS

Use of a conservative approach in the risk assessment process may be prudent since scientific knowledge of the potential effects of exposure to low levels of toxic chemicals is not complete, however the resulting potential estimated risks from ground water contamination at the CPS site are likely exaggerated. Although the actual risk are likely lower than the risk estimates calculated for the CPS site using conservative assumptions and toxicity values, potential risks to a residential potable water use population exceed the regulatory benchmark of unity for noncancer effects (239 for child through ingestion ;579 for an adult through ingestion and inhalation) (Table 4-11), and 3.2E-02 for combined (adult and child) carcinogenic effects from exposure to contaminated ground water.. In addition, a ground water ingestion and inhalation exposure assessment conducted using less conservative central tendency assumptions values resulted in pathway hazard indices for a child and adult which also significantly exceeded the regulatory bench mark of unity (166 for a child and 71 for an adult)(Table 4-12). Based on these findings, the site poses potential non-cancer and cancer human health risk through the ground water pathway.

Elevated levels of inorganic metals in site soils at the adjacent Superfund site has resulted in observable adverse effects to trees and other vegetation located in the vicinity of their facility. The adjacent facility is an active Superfund site and currently operates recovery wells to intercept metals contaminated ground water emanating from the site. While the baseline risk assessment does not segregate potential adverse effects due to off-site contamination from site related contamination, it is important to note that operations at the CPS site have never included any use or generation of inorganic metals, products, by-products and wastes. Metals contamination detected in soils and particularly ground water are likely attributable to natural background and operations at the adjacent site.

The noncarcinogenic total exposure hazard index and carcinogenic total pathway risk estimates for incidental ingestion of Arsenic contaminated soils by a process area site worker (HQ=.005; cancer risk = 8.1E-07) and future land use construction worker (HQ= .01;cancer risk =8.1E-08) are below the regulatory thresholds which indicate unacceptable risk(Table 4-13 &4-14). Therefore no significant risk of noncarcinogenic or cancer effects is expected through this exposure pathway of concern. Furthermore, arsenic concentrations detected in site soils are indicative of naturally occurring levels in suburban Middlesex County as well as statewide suburban area(Fields et al., 1993)

Discounting the arsenic hazard quotients from residential potable ground water ingestion exposure pathway hazard index due to natural background soil conditions does not significantly reduce the noncarcinogenic exposure pathway (16 for child; 23 for adult). Similarly, discounting arsenic chemical specific cancer risk of 8.4E-04 for a child and 2.3E-03 for an adult from the residential potable ground water ingestion exposure from the total pathway risk does not significantly reduce the cancer total pathway risk (2.4E-02) or total exposure risk (3.2E-02) estimates(Table 4-15).

The estimated potential noncarcinogenic and carcinogenic risk from residential potable ground water use (ingestion and inhalation) exposure pathways associated with the CPS ground water VOC contamination plume are being mitigated through an interim remedial action which includes ground water recovery, treatment with air strippers and vapor/aqueous phase carbon beds prior to discharge to the local POTW or an on-site recharge basin located upgradient of the recovery wells. Capture is monitored in the quarterly Performance Monitoring Program reports submitted to the NJDEP.

Operation of the ground water recovery and treatment system will continue until appropriate ground water quality standards (i.e. NJDEP A 280 chemicals) are realized or will be achieved through natural attenuation with NJDEP and USEPA approval. This remedial approach effectively and adequately mitigates estimated potential human health risks resulting from exposure through ingestion and inhalation of contaminated ground water.

5.0 Interim Remedial Measures

On-Site Interim Remedial Measures

The on-site interim ground water recovery and treatment system began operation in March of 1996 in response to identification of Tank Farm # 5 in the main process area as the major source of elevated levels of VOCs in the groundwater. Groundwater is recovered along the southwestern corner of the site by extraction wells CPS-3A and WE-2RA(wells CPS-3/WE-2R were replaced as a result of maintenance issues). The groundwater is treated via a tray type air stripper and the stripped VOCs adsorbed onto vapor phase carbon. The groundwater is then polished with aqueous phase granular activated carbon. The treated water is then discharged to an infiltration trench constructed to the north of the CPS facility, upgradient of the on-site recovery wells, or discharged to the plant sewer which flows to the Middlesex County Utilities Authority.

At a combined pumping rate of 30 gpm, wells CPS-3A/WE-2RA induce hydraulic capture in the source area. Since inception of pumping in March 1996, source area VOC concentrations have dramatically declined from more than 18 ppm to approximately 4 ppm in groundwater. Downgradient of the source area in the Runyon Well Field, VOC concentrations have also declined dramatically, and as a result all downgradient CPS recovery wells have ceased operation (RW-1, RW-2, RW-5). The Performance Monitoring Program (PMP) continues to monitor the decline in VOC concentrations in the downgradient plume (Figure 3-4) .

However, a recent increase in VOC concentration in capture system sentinel well CPS-1 has tested the conceptual model for the pump-and-treat system. As a result, additional characterization data are being collected to help explain the data and provide a solution. Section 7.1 provides a summary of the recent CPS-1 characterization field work.

Madison Industries continues to operate extraction wells in order to mitigate metals contamination in groundwater (see also Section 7.1).

6.0 Post RI Investigations

6.1 Surface Water Sampling

As detailed in Section 3.5, multiple rounds of surface water and sediment sampling has been conducted in and around the site

Surface water is present only intermittently in Pricketts Pond and Pricketts Brook following precipitation events. Neither the pond nor the brook is used for recreational purposes. An additional round of surface water sampling was conducted in December 1999 at the request of NJDP. A sample was collected at the head of Pricketts Pond, the head of Tennent Pond, and upstream of the CPS Site. The results were presented in the March 2000 PMP report and are included here as Table 3-3. Low level detections of chloromethane and chloroform were reported. Although acetone was detected in the low ppb range, it was also found in the trip blank at much higher concentrations.

6.2 Monitored Natural Attenuation Study

Ciba initiated a natural attenuation study program in December 1999 as described in the *Natural Attenuation Work Plan* (November 1999), which was finalized on June 14, 2000, to reflect responses to comments from NJDEP dated May 15, 2000. The study was undertaken to investigate the role that natural attenuation processes may play in future overall remediation activities.

The Natural Attenuation Work Plan described work to meet the requirements pursuant to the Technical Requirements for Site Remediation (N.J.A.C. 7:26E) regarding natural remediation of groundwater contaminated with organic compounds associated with the former CPS site at Old Bridge, New Jersey. The requirements apply to any portion of groundwater contaminant plumes that are not contained or otherwise not actively managed. The purpose of the requirements is to ensure that potential receptors are protected. In this case, the receptors of interest are the Perth Amboy water supply wells in the Runyon well field. The work plan details measures to ensure that groundwater that does not meet NJGWQ standards will not impact the Perth Amboy water supply wells.

A Draft Natural Attenuation Report was submitted to the NJDEP which summarizes the results of the natural attenuation program, which included eight (8) quarterly groundwater monitoring events (PMP program) and three (3) annual slow purge sampling and analysis events during which geochemical analyses were completed. Quarterly PMP sampling also occurred concurrently with the geochemistry monitoring events.

The results of applying the statistical tests to the plume downgradient of the source zone were mixed relative to supporting natural attenuation. Long-term data trends appear to support improvements in groundwater quality. For the more downgradient wells, which are two or more years travel time from the source area, trends resulting from improvements of groundwater quality at the source area (e.g., due to an efficient capture system) are expected to be slower in evolving and are more difficult to interpret. However, the long-term trend in these wells, as indicated in Table 3-2 and Figure 3-4, does support improvement in groundwater quality.

The data and groundwater modeling results support the idea that long-term groundwater quality improvements are being made by natural attenuation processes. The observed trends in the magnitude of site-related VOCs implies that operation of the on-site capture system, with a performance monitoring program (PMP), should continue.

6.3 Draft Feasibility Study

A revised draft Feasibility Study was prepared for the site and submitted to the NJDEP and USEPA on May 10, 2001 The FS reviewed the historical and current status of remedial activity at the site and evaluated viable remedial alternatives which addressed the contamination in the source area and downgradient groundwater plume and which would satisfy the remedial action objectives and source area specific preliminary remediation goals.

The above-referenced FS is still under review by the NJDEP and USEPA. However, as was previously noted, the manufacturing facilities at the site have been demolished and other remedial alternatives (including but not limited to source area ex-situ alternatives) may now be appropriate for further evaluation. It is anticipated that a revision to the FS will be required when the results of the Supplemental RI studies currently being conducted are completed (see Section 7). A brief summary of the 2001 FS is presented here with the understanding that alternate remedial activities and technologies may now be appropriate.

6.3.1 Introduction

As per the guidance for conducting feasibility studies under CERCLA (EPA 1988), the developed alternatives cover a range of options from no further action to containment to treatment. The process used in developing the alternatives considers 1) the type of contaminants in the source area, 2) the location of the impacted material (saturated or unsaturated zone) and 3) the matrix type (contaminated soil/ groundwater).

Among the organic COCs for the site, there are differences in treatability of the COCs by different technologies. As an example, tetrachloroethene does not biodegrade under aerobic conditions, however anaerobic biotreatment is effective for that compound.

The location of the material to be treated also determines the applicable alternatives. There are three (3) location criteria, 1) surface soils, 2) subsurface soils in the unsaturated zone, and 3) subsurface soils in the saturated zone (below the water table). All soil is considered for impact to groundwater.

The three (3) location criteria indicated above were considered in the development of alternatives included in this FS. Key factors considered in the development and subsequent evaluation of remedial alternatives for the Site are:

- PRGs have been developed for the source area at the Site and groundwater plume emanating from the source .
- The location of contaminants restricts the applicability of some technologies. For example, this was discussed above for the case of soils above and below the water table in the source area.
- Some contaminants within the same class (organics) are not equally treatable by all technologies.

Assumptions made in developing the alternatives listed below and evaluated in the FS are:

1. Each alternative is designed to address the PRG for the source area and downgradient groundwater plume.
2. The PRGs are satisfied by each developed alternative. The No Further Action alternative is required by regulation to be carried through the evaluation process.

6.3.2 List of Alternatives

Each of the alternatives developed for the Site is described in this subsection.

In the case of the No Further Action Alternative, no additional active remediation is considered, however the existing Interim Remedial actions (source area caps, source area groundwater capture and treatment and MNA of downgradient plume) would continue until the PRGs have been attained.

The only additional remediation technology types that survived the technology screening for saturated zone materials are *in-situ* bioremediation and Groundwater Circulation Well technology.

The alternatives developed for the on-site source area and the down gradient groundwater plume are:

<u>Alternative 1, No Further Action</u>

<u>Alternative 2, On-Site Hydraulic Containment and Monitored Natural Attenuation</u>

<u>Alternative 3, Containment Based Remediation (GCW)</u>

Alternative 4, On-site, *In situ* Biotreatment Based Remediation

6.3.3 Remedial actions common to two or more alternatives.

In all alternatives, the source area groundwater capture and treatment system will be operational until aquifer restoration is achieved or until Monitored Natural Attenuation will support the shut down of part or all of the system.

6.3.4 Alternative Descriptions

Alternative 1, No Further Action: This alternative assumes that no action is taken in the source area other than the systems that are currently in place. In place systems are the groundwater extraction and treatment system, in which hydraulic containment of the source is achieved, and concrete/asphalt caps which cover the plant production area. These systems are protective with respect to groundwater. Additionally, the on-going PMP sampling program will continue until groundwater quality meets MCLs.

A preliminary study of the feasibility of Monitored Natural Attenuation to achieve remediation goals has been completed. Analysis of this study indicate the potential effectiveness of natural processes in protecting the Perth Amboy water supply wells.

Alternative 2, On-Site Hydraulic Containment and Monitored Natural Attenuation: This alternative is similar to no further action, except that Monitored Natural Attenuation will be implemented. In this alternative, the PMP monitoring will continue until the VOCs groundwater quality in the plume meets MCLs.

Alternative 3, Containment Based Remediation: In this alternative, the on-site caps and groundwater extraction and treatment system were to provide the means of source area control, while the groundwater control system, including the installation of one or more groundwater circulation wells, will provide containment and treatment of contaminants. . The groundwater circulation wells will be located such that contaminated groundwater containing one or more COCs above their respective MCLs is captured and treated. In well air stripping would remove contaminants from the groundwater before it is released back to the aquifer.

In general TVOC concentrations in the portion of the plume downgradient of the

CPS/Madison properties are low, ranging from 1 μg/L to 17 μg/L, with the single exception of WCC-16VS.

Alternative 4, On-site, *In situ* Biotreatment Based Remediation: In this alternative, material within the saturated zone and unsaturated zone that requires treatment based on remediation goals for groundwater will be remediated by *in situ* bioremediation. *In situ* bioremediation will be implemented at the site by the injection of oxygen and nutrients.

The on-site hydraulic containment system will intercept dissolved material leaving the treatment zone. This water, complete with remaining nutrients, will undergo pretreatment to remove iron. This pretreated flow will be recirculated to the bioremediation system and nutrients added, as appropriate. The final decision on how to aerate the groundwater would be determined during design, should this alternative be selected.

In the unsaturated zone, air sparged to the groundwater will also be released to the soil air. Nutrients, if required, could be added in the vapor phase to the unsaturated zone, as well. In the treatment zone, fluctuations in the water table would also provide a source of dissolved phase nutrients and oxygen to the lower part of the unsaturated zone.

The other components of this alternative are the current on-site hydraulic capture and implementation of MNA in the plume downgradient of the site.

As stated in the introduction, it is anticipated that a revision to the FS will be necessary.

7.0 Current Projects

This section presents the results of recent groundwater characterization studies and source area soil sampling. A brief summary of the status of the production facility demolition is also included.

Note: **For ease of review, Figures for this section are included within the section.**

7.1 CPS/Madison Groundwater Contaminant Distribution Characterization

7.1.1 Purpose

The purpose for this Section is to provide a characterization of the groundwater contamination attributable to the CPS/Madison Site based on available local and regional hydrogeological and water quality data. With this information, the effectiveness of the pump-and-treat systems is also assessed.

7.1.2 Implementation

The first step is to compile a characterization database. The following information was compiled:

1. Regional GIS (NJ and USGS internet archives)
    - Topographic maps
    - Air photos
    - Watersheds
    - Surface water (streams, lakes, wetlands)
    - Land use

2. Existing historical Site-related documentation
    - Evor Philips Leasing Company (EPLC) Site Data
        i. Supplemental GW RI Report (5/2004)
        ii. NPL Site Amendment No. 1 (5/2005)

    - CPS/Ciba (CPS) Site Data
        1. RI Reports (Phase 1, 1/94 and Phase 2, 5/96)
        2. PMP reports (WQ from 1991 to 2004).
        3. Natural Attenuation Report (2002)

    - Madison Industries (MI) Site Data
        i. RI Report (9/96)
        ii. PMP reports (WQ from 1997 to 12/2004 [report 55])

In addition to these historical documents, the following recently compiled data was included:

3. Conduct special characterization sampling (Ciba)
    - Geoprobe profiling VOC (5/03 and 7/05)
    - Metals and VOC at monitoring wells not currently on SAMP (on and off CPS property) [12/04 and 3/05]

These data were combined using visualization software to derive plume impact zones (plan view and depth) based on

- Regional flow (regional GIS, water supply pumping).
- Local flow, based on water level data and pump well locations and extraction rates.
- Locations of source areas.
- Spatial and temporal trends in water quality at monitoring wells.

7.1.3 Hydrogeology

For the purposes of this discussion, the aquifer associated with the contaminant plume is assumed to be relatively homogeneous and unconfined, consisting of unconsolidated sands, silts and clays (see Section 3.2).

Figure 1 shows the Site relative to the regional topography. Note that there is a topographic high to the north and west of the Site, and the slope drops along the principle drainage-way (toward Tennent Pond). Figure 2 presents the implied regional surface water and groundwater flow patterns based on GIS watershed boundary and surface water drainage layers, and the locations of the Perth Amboy water supply wells (PA-series). Note that the natural groundwater flow direction away from the CPS/Madison Site is along the Prickets Brook drainage way. The Perth Amboy supply wells, pumping at a rate of approximately 2.5 million gallons per day, are shown to skew the flow lines off their natural path. Data supporting this feature are discussed below.

An important component for understanding past and present contaminant distribution is a characterization of aquifer stress conditions (e.g., pumping wells and surface water) over time. Figure 3 provides a summary of 'early' stress conditions. It shows what can be considered the first-generation pump-and-treat well configuration (see Section 2.2.4). Figure 4 shows the current pumping stress configuration. These are the regional wells that are assumed to have influence on contaminant distribution in groundwater.

By combining the data shown in Figures 1 through 4, with the water level data from the CPS/Madison PMP and the EPLC monitoring program, a regional groundwater flow net can be drawn (Figure 5). This flow net is assumed to be relatively constant given the current stress configuration.

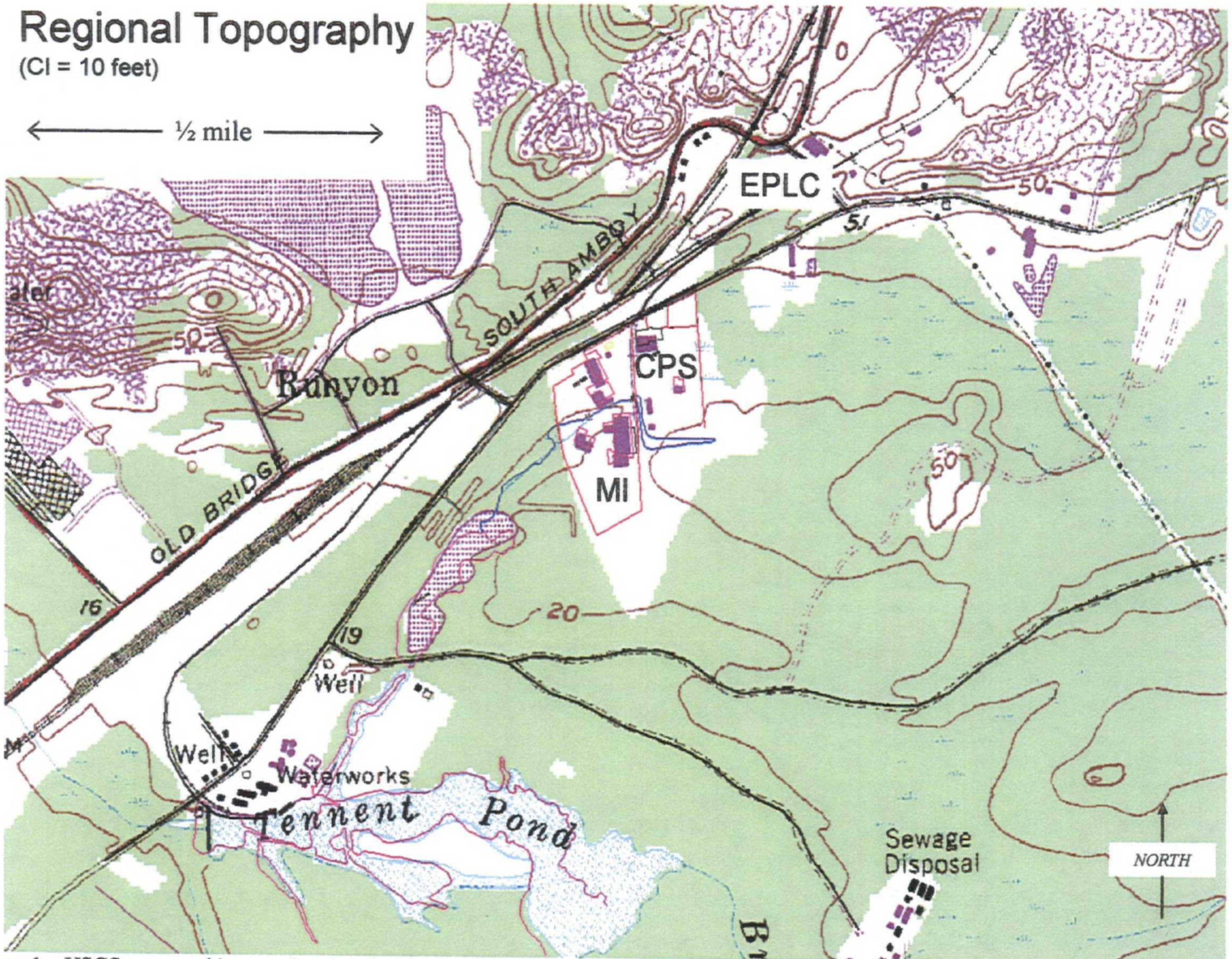

Figure 1 – USGS topographic map showing the Site locations relative to topographic high to the north and west and the low to the south and east.

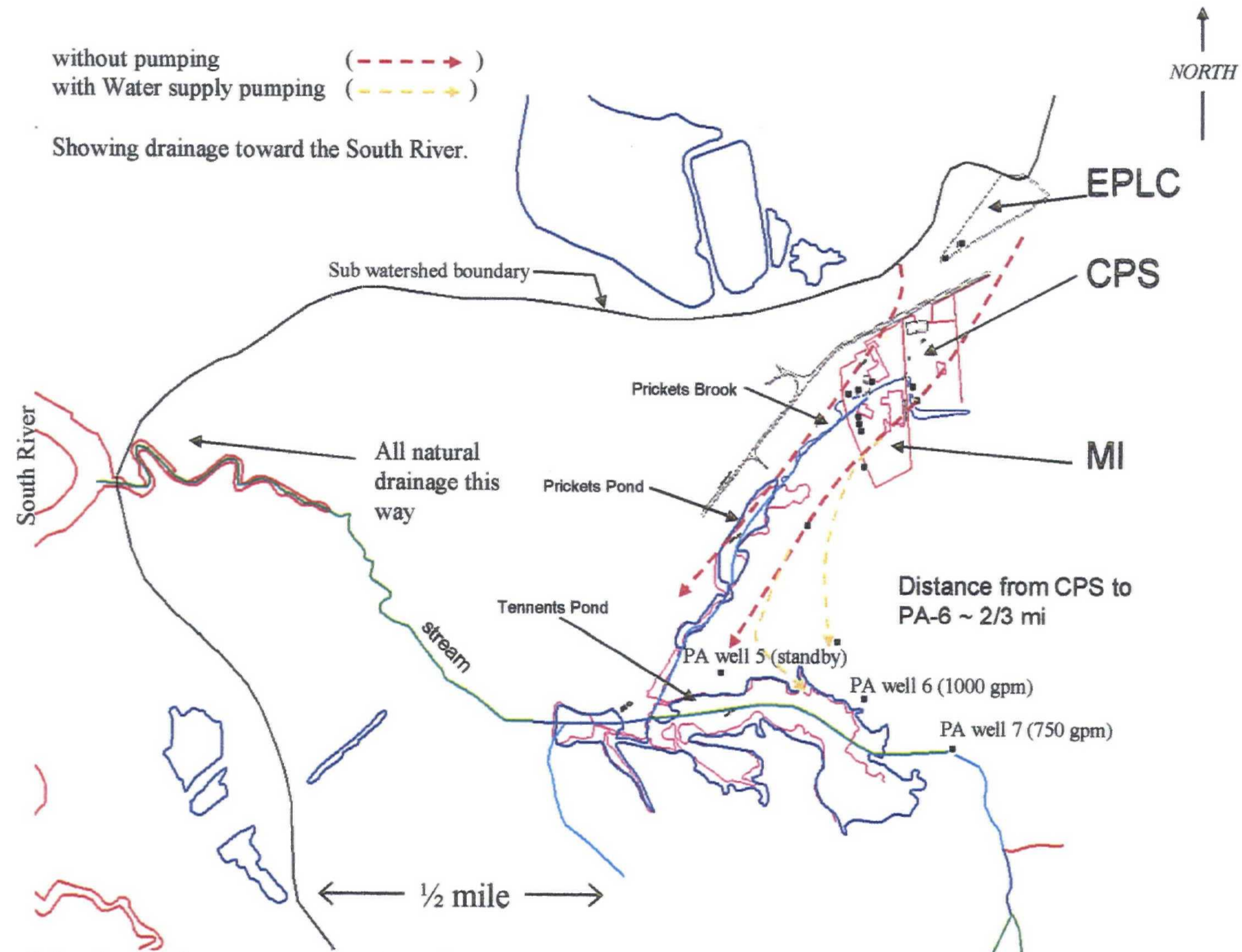

Figure 2 – Implied regional surface water and groundwater flow patterns based on GIS watershed boundary and surface water drainage layers, and the locations of Public Supply wells (PA-series). The blue, red and green lines represent surface water expression.

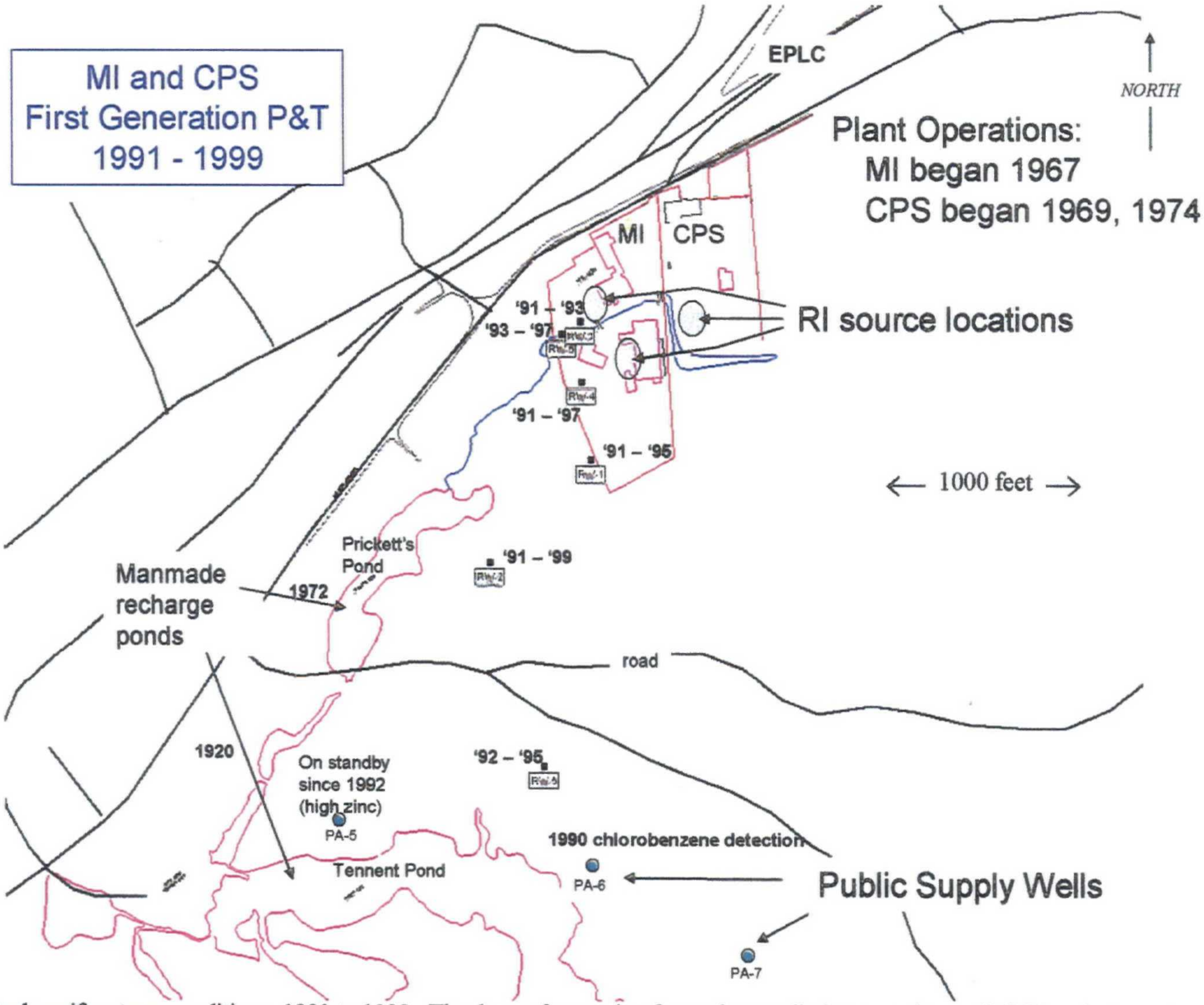

Figure 3 – Historical aquifer stress conditions, 1991 to 1999. The dates of operation for each remediation pumping well (RW-series) are shown. Some relevant site history is also provided.

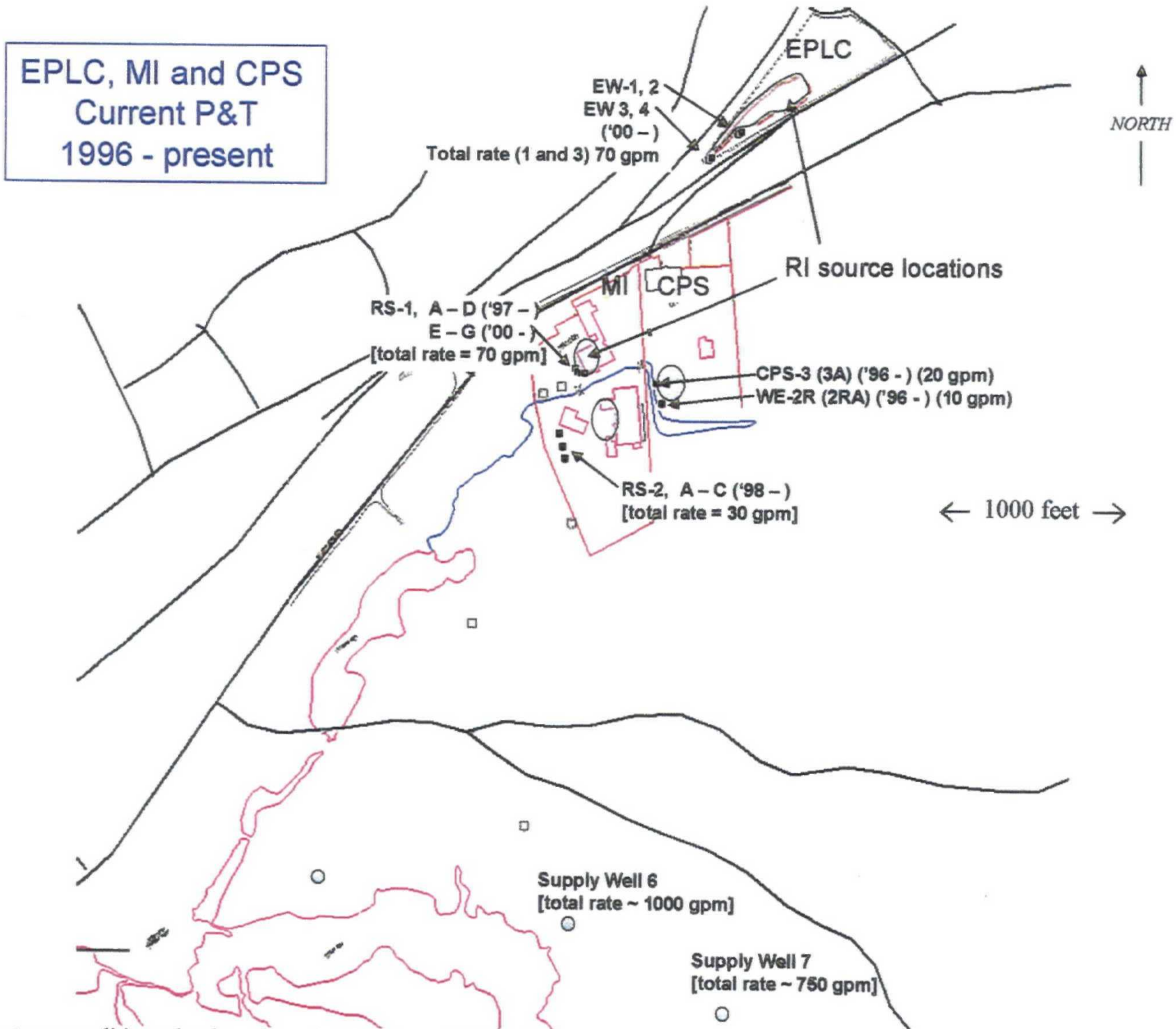

Figure 4 - Aquifer stress conditions that have been in play from 1996 to the present.

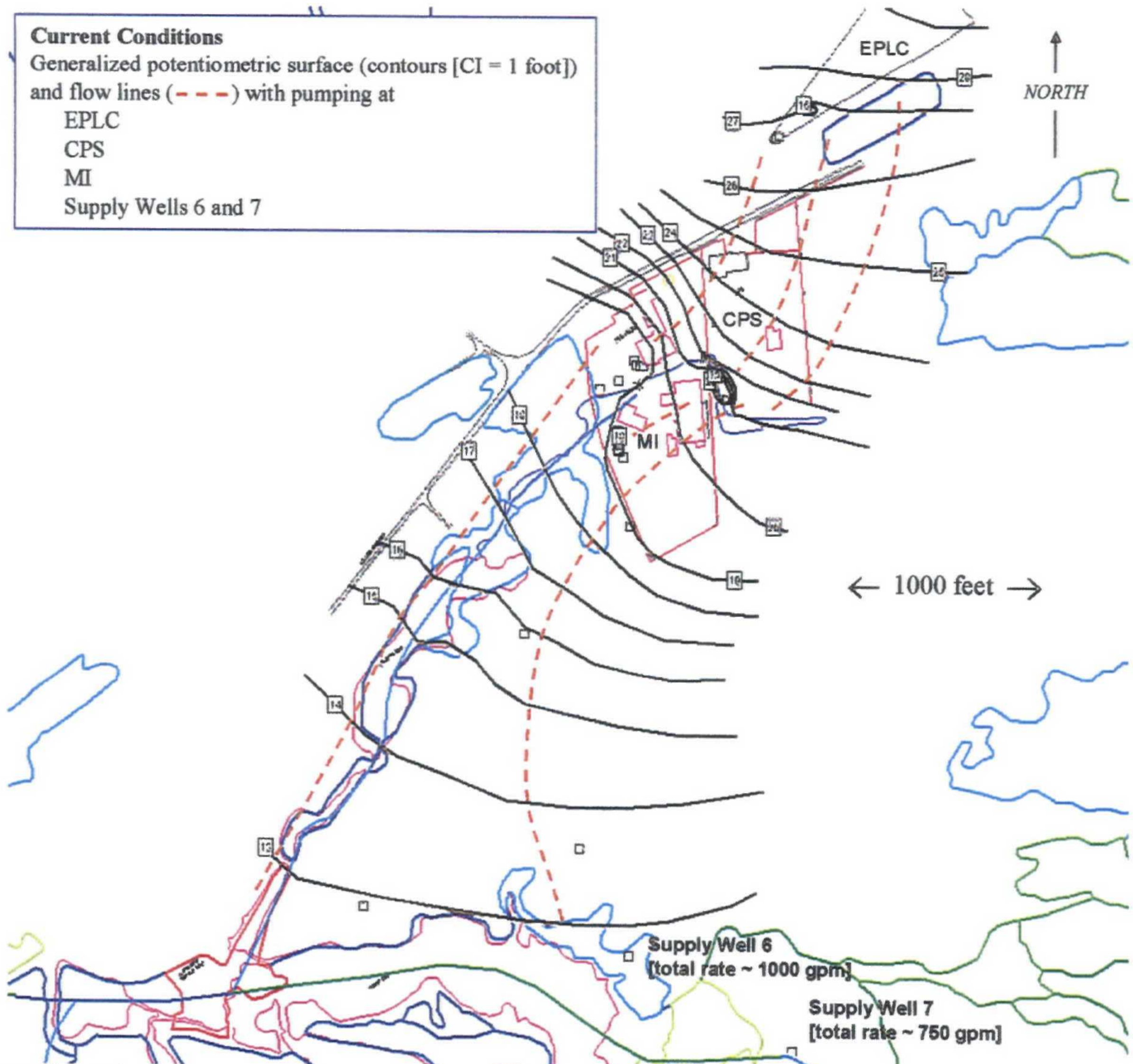

Figure 5 – Generalized potentiometric surface map based on recent water level sampling associated with the PMP program, and regional flow conditions presented in Figure 2. The blue, red and green lines represent surface water expression.

7.1.4 Identify site-Specific Compounds

As shown in Figures 5 and 6, groundwater contamination at and downgradient of the CPS/Madison Site is the result of contaminant source and transport conditions associated with three independent sites located along the regional groundwater flow lines. These sites are, from upgradient to downgradient: EPLC, CPS and MI.

From analysis of the Site-specific water quality databases available form RI and PMP reports, the following site-specific compounds have been identified:

- Madison Industries - Metals
  - Zinc
  - Copper
  - Lead
  - Cadmium
- CPS – Volatile Organic Compounds (VOCs)
  - Chlorobenzene (CB)
  - Dichlorobenzene (DCB)
  - BTEX
- EPLC - VOCs
  - 1,2-Dichloroethane (12DCA)
  - Methylene Chloride (MeCl)
  - TCE
  - cis-1,2-Dichloroethylene (cis-12DCE)

Note that both EPLC and CPS are characterized based on VOC contamination, while MI is characterized based on metals contamination.

7.1.5 VOC-Plume Characterization

The total VOC plume (TVOC) at and downgradient of the CPS/Madison Site is generally the sum of the contribution from both the EPLC and CPS Sites (Figure 6). Figure 7 shows an interpretation of the TVOC plume at the site level based on source area, hydrologic and water quality data (2004 CPS data and 2003 EPLC data). The plume appears to be 30 to 50 feet below ground surface (BGS).

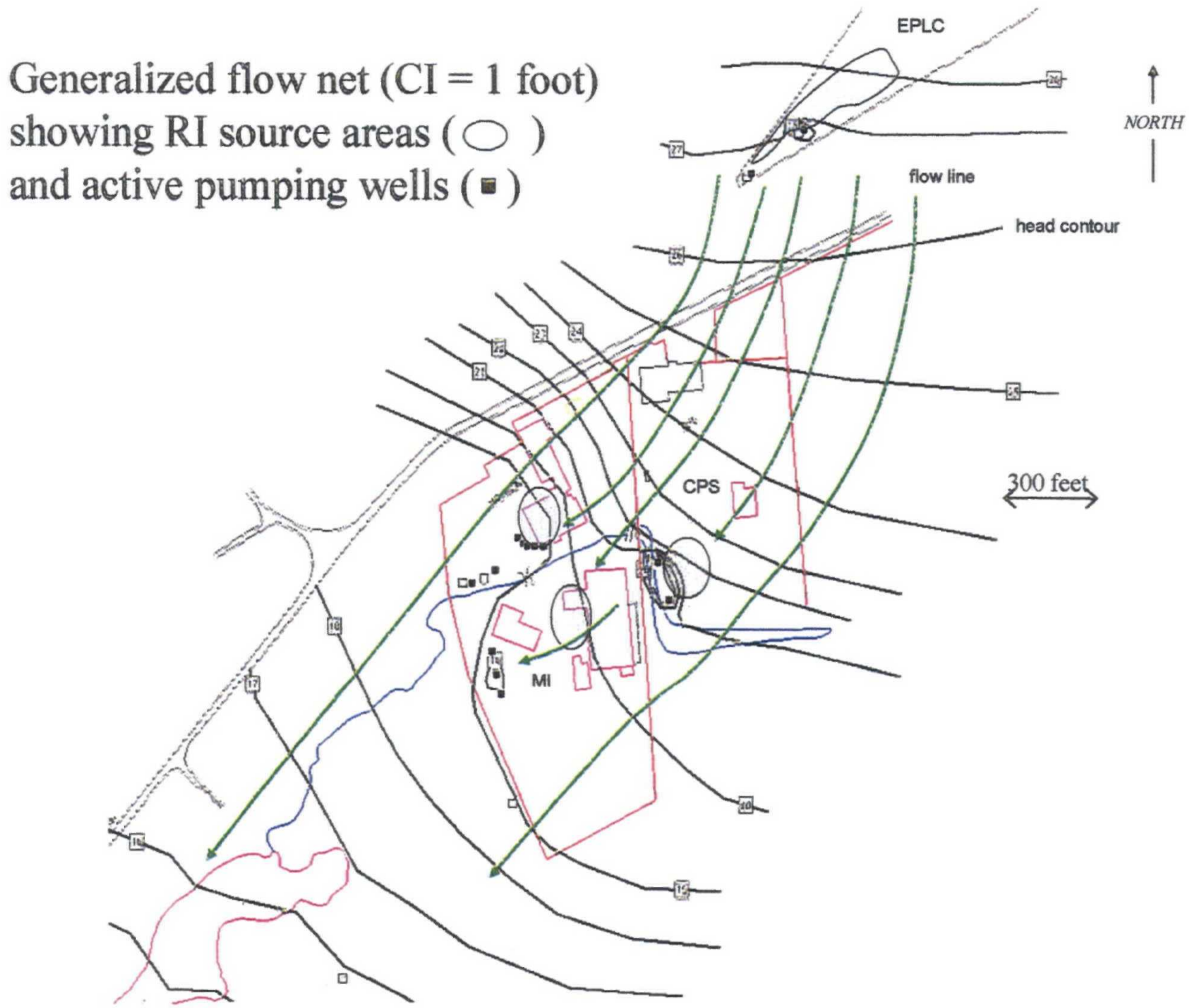

Figure 6 – Ground water flow net based on site-specific data and an interpretation of regional flow patterns, showing the hydraulic connection of the three sites affecting groundwater quality.

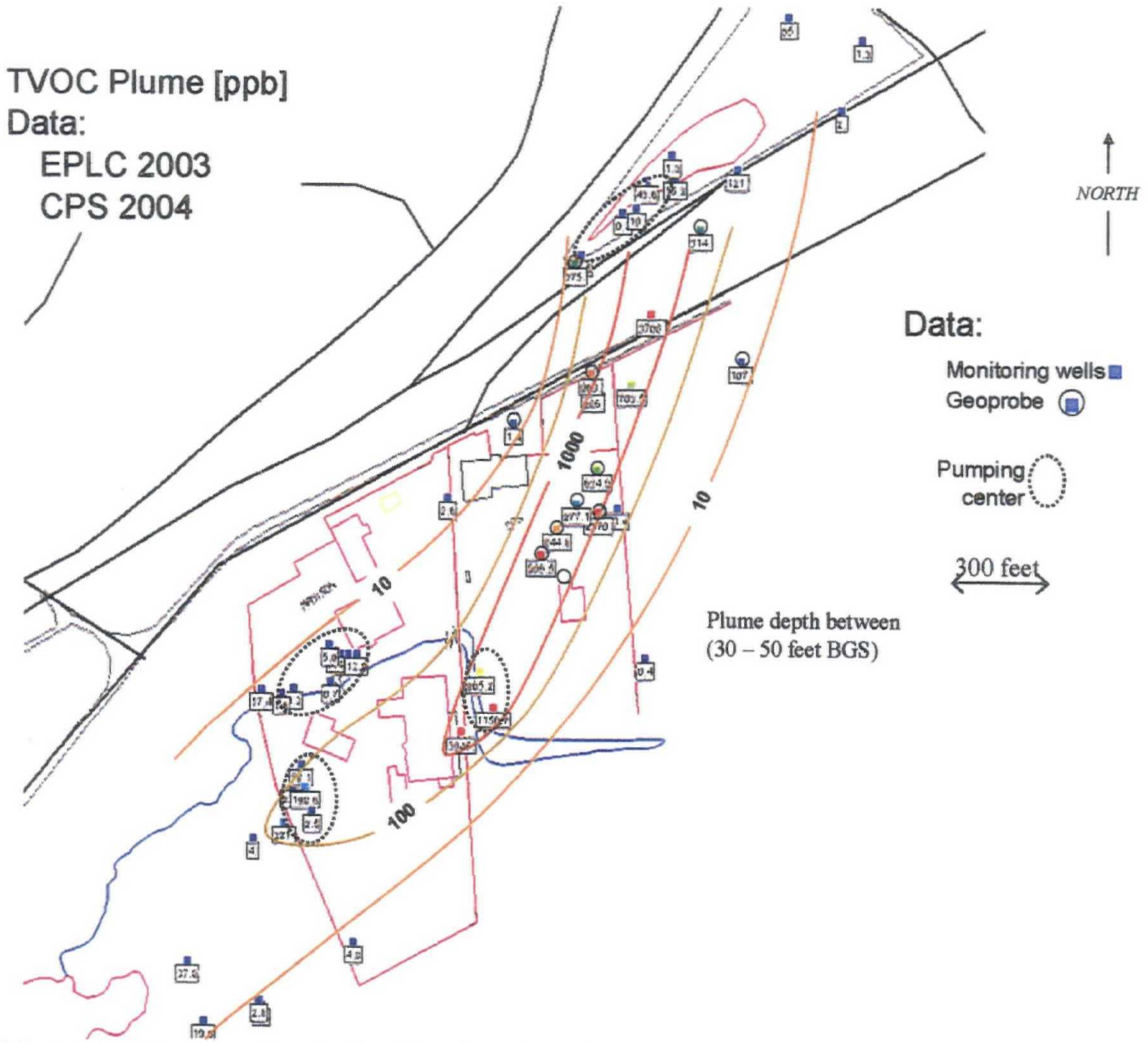

Figure 7 – Interpretation of the total VOC plume at the site level based on data relevant to source area location, groundwater flow direction, water quality. The TVOC data shown are form recent groundwater monitoring (wells and geoprobe).

To understand the contribution to groundwater contamination from the CPS site, consider the 'fingerprint' compounds identified in the previous section. Figure 8 provides a representation of the data, where the TVOC concentration was normalized by the sum of the EPLC compounds identified (12DCA, MeCl, TCE, cis-12DCE). If data points >90% are indicative of EPLC mass, and the groundwater flow field is well characterized, then it is clear that the CPS plume emanates from the general source area location shown, and that mass upgradient and side-gradient of this source area are attributable to EPLC. This conclusion is further enforced by plotting the 12DCA and CB plumes (Figures 9 and 10, respectively), where the 12DCA plume is attributed to EPLC and the CB plume is attributed to CPS. The plumes do not overlap except at and downgradient of the CPS source area.

The CPS plume can be further characterized by first characterizing near-field data and then characterizing far-field, downgradient, data. Figure 11 provides recent CB data just downgradient of the CPS source area. The plot shows the CB result at monitor well CPS-1 over time. It is interesting to note that the concentration increased after the pumping well, WE-2R was moved about 15 feet north and east (WE-2RA) because of operation problems. Note that the new well pumps at twice the rate as the former (~15 GPM versus ~7 GPM). To investigate this observation further, a geoprobe transect was taken along the CPS-1 side of the drainage ditch that separates the CPS onsite pumping center (CPS-3A and WE-2RA) from the downgradient transport direction. The results are summarized in Figure 12. Significant mass of CB, DCB and benzene was found to occur at least 50 feet on either side of CPS-1. This mass had limited extent vertically, located between 25 and 35 feet below ground surface.

To facilitate comparison of the CPS-1 data with that associated with the pumping wells, CPS-3A and WE-2RA, Figure 12 provides water quality time-history plots for the pumping wells. While the composition of the mass is similar across the drainage ditch, the magnitude is not. Thus, it is not clear whether the mass observed at CPS-1 is due to incomplete capture of the characterized source area or there is source material downgradient of the pump-and-treat capture envelope.

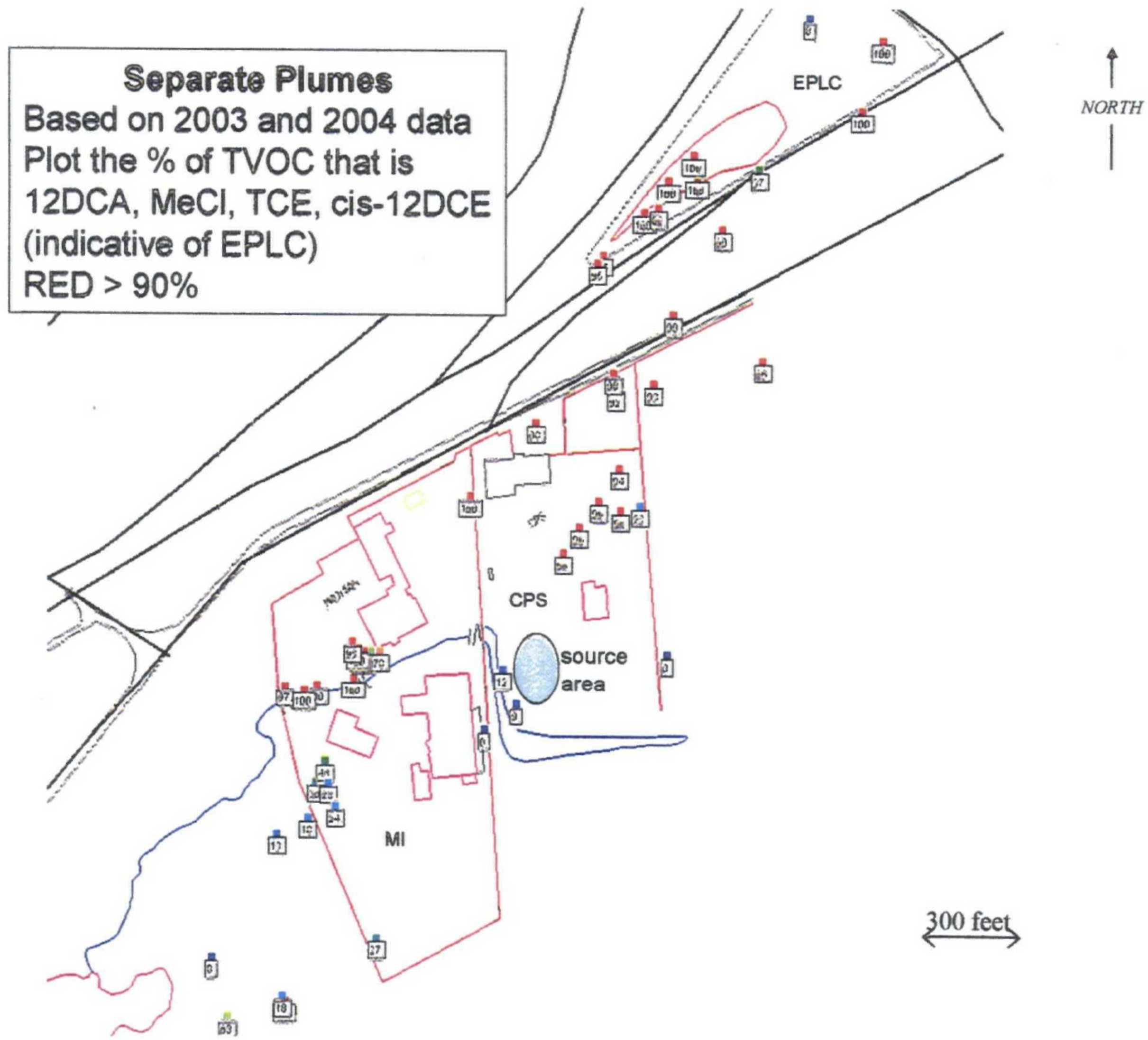

Figure 8 - In an effort to separate the EPLC and CPS contributions to groundwater contamination, the TVOC data used in Figure 7 was normalized by the sum of "EPLC compounds." Red data points (>90% EPLC compounds) are considered part of the EPLC plume.

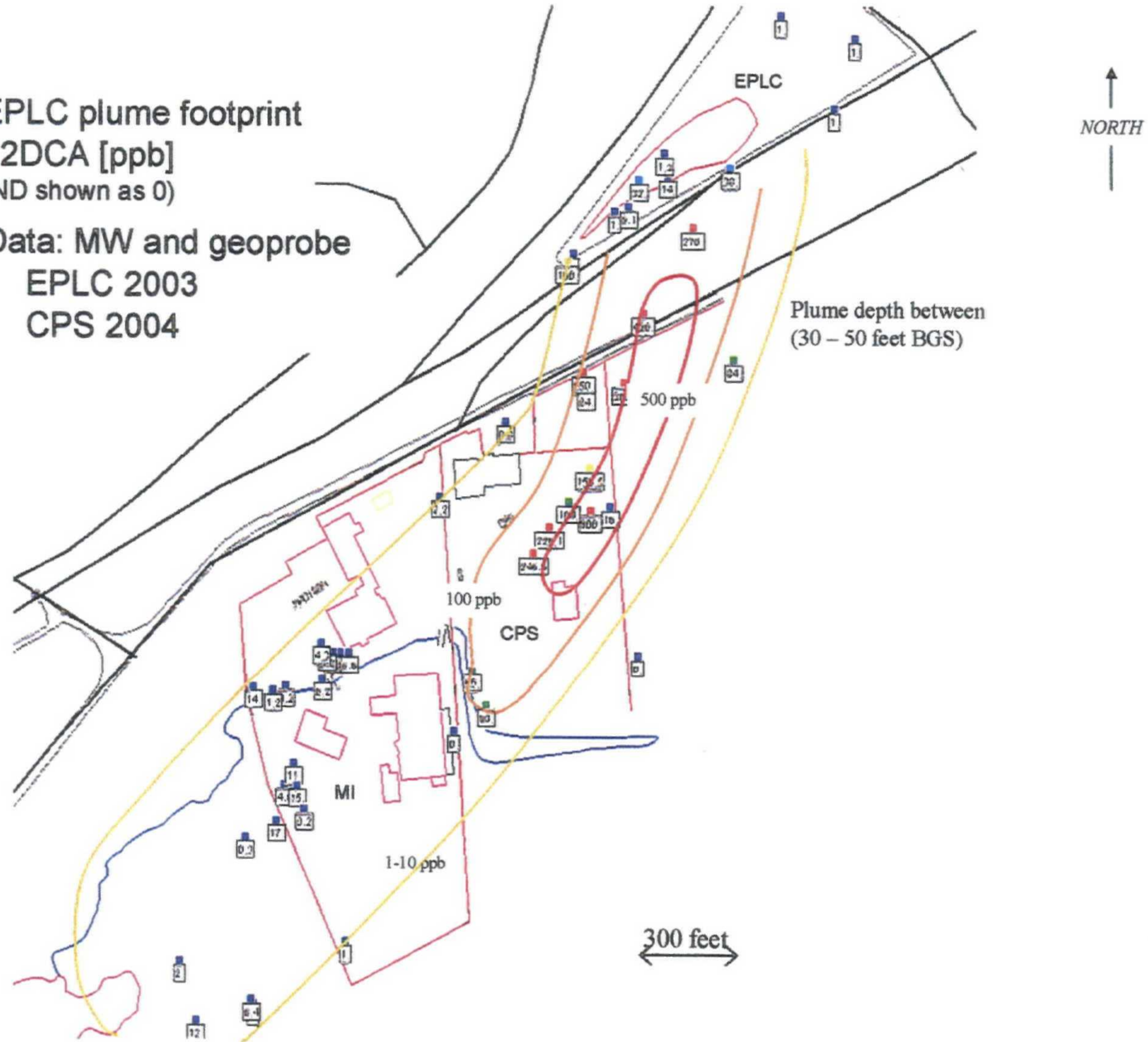

Figure 9 - Interpretation of the 12DCA plume at the site level based on data relevant to source area location, groundwater flow direction, and water quality. The data are the same as were used in Figures 7 and 8.

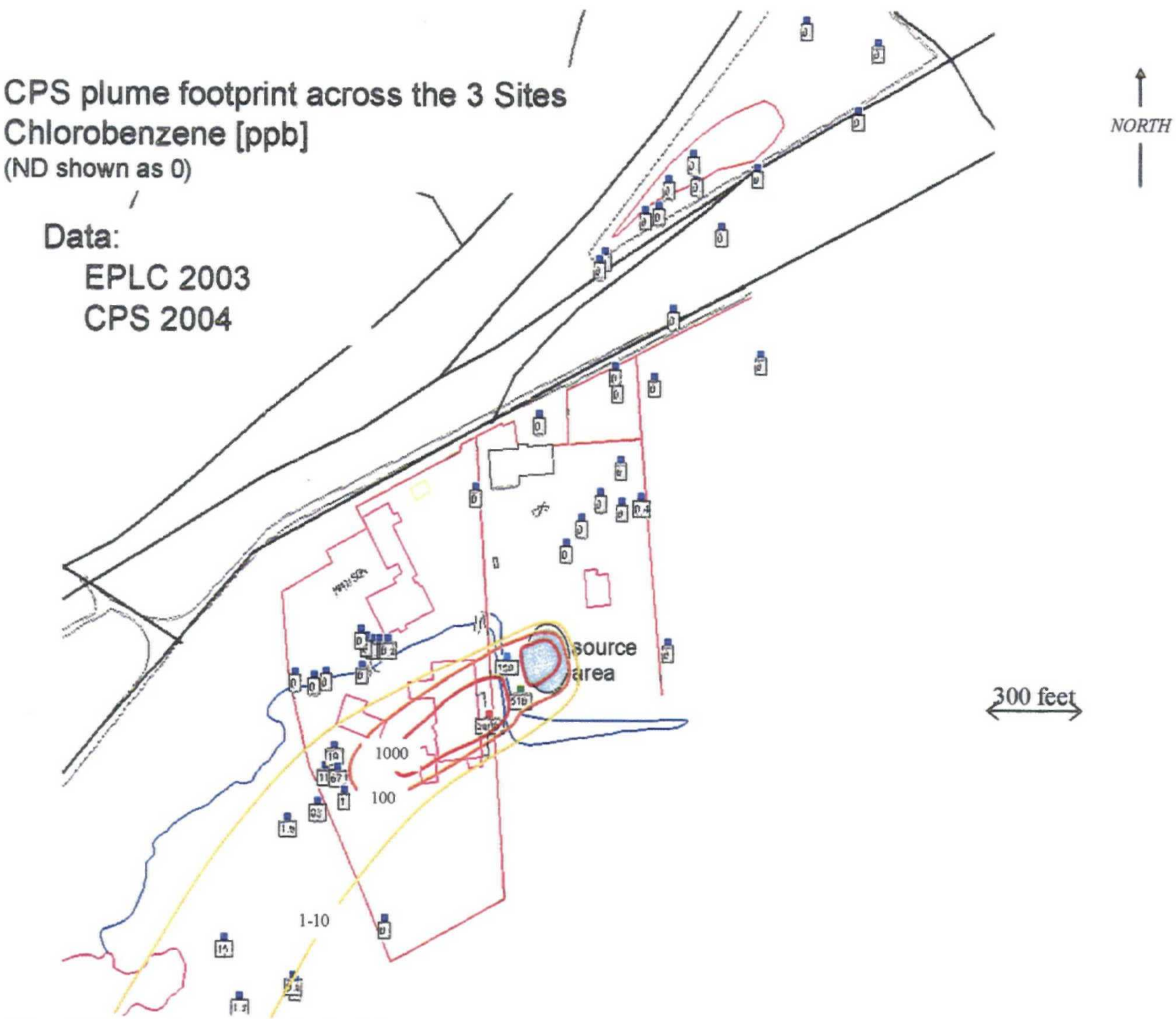

Figure 10 - Interpretation of the CB plume at the site level based on data relevant to source area location, groundwater flow direction, and water quality. The data are the same as were used in Figures 7 and 8.

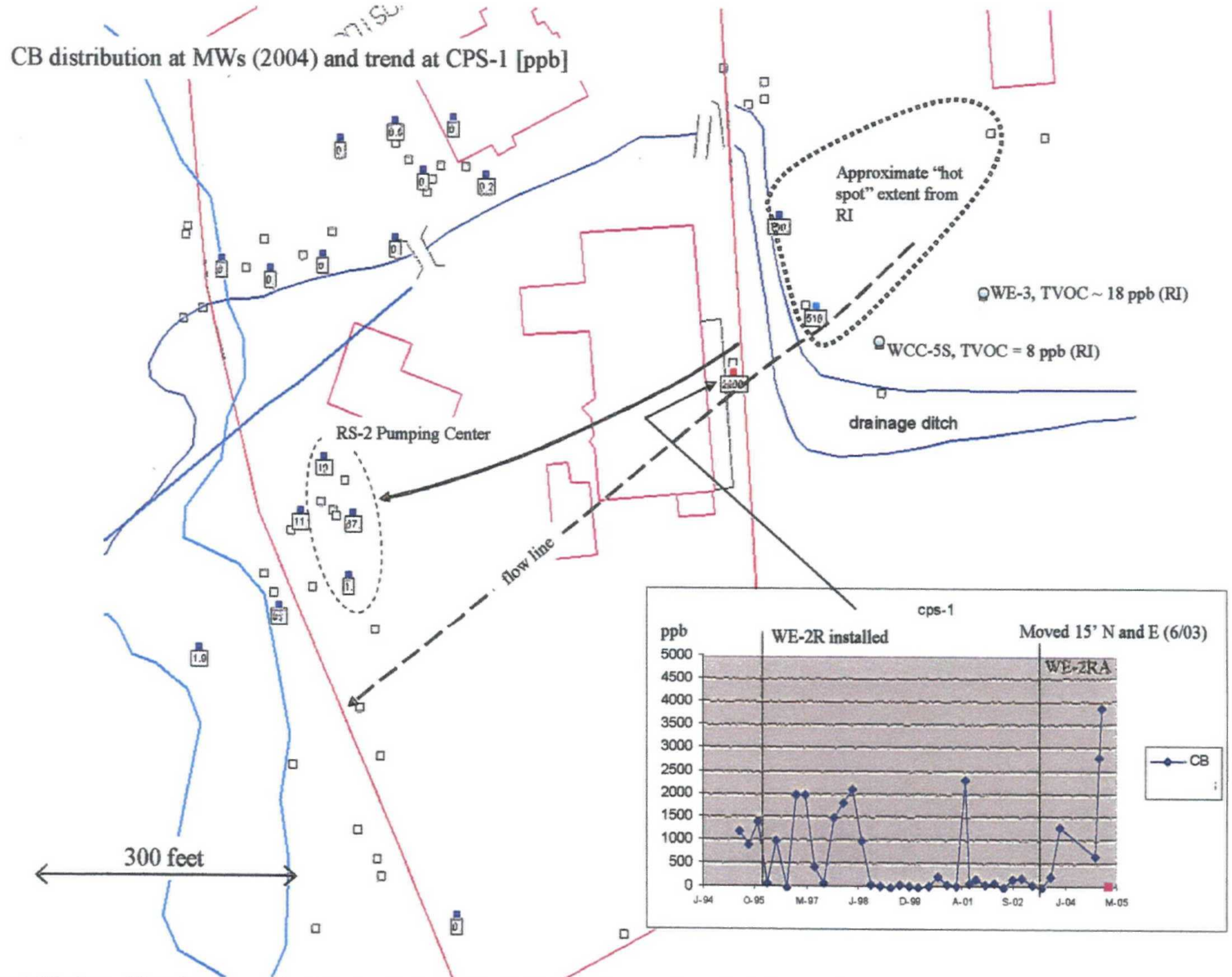

Figure 11 – Local CB data. The plot shows the CB result at monitor well CPS-1 over time. It is interesting to note that the concentration increased after the pumping well, WE-2R was moved (WE-2RA) because of operation problems. The new well pumps at twice the rate as the former (~15 GPM versus ~7 GPM).

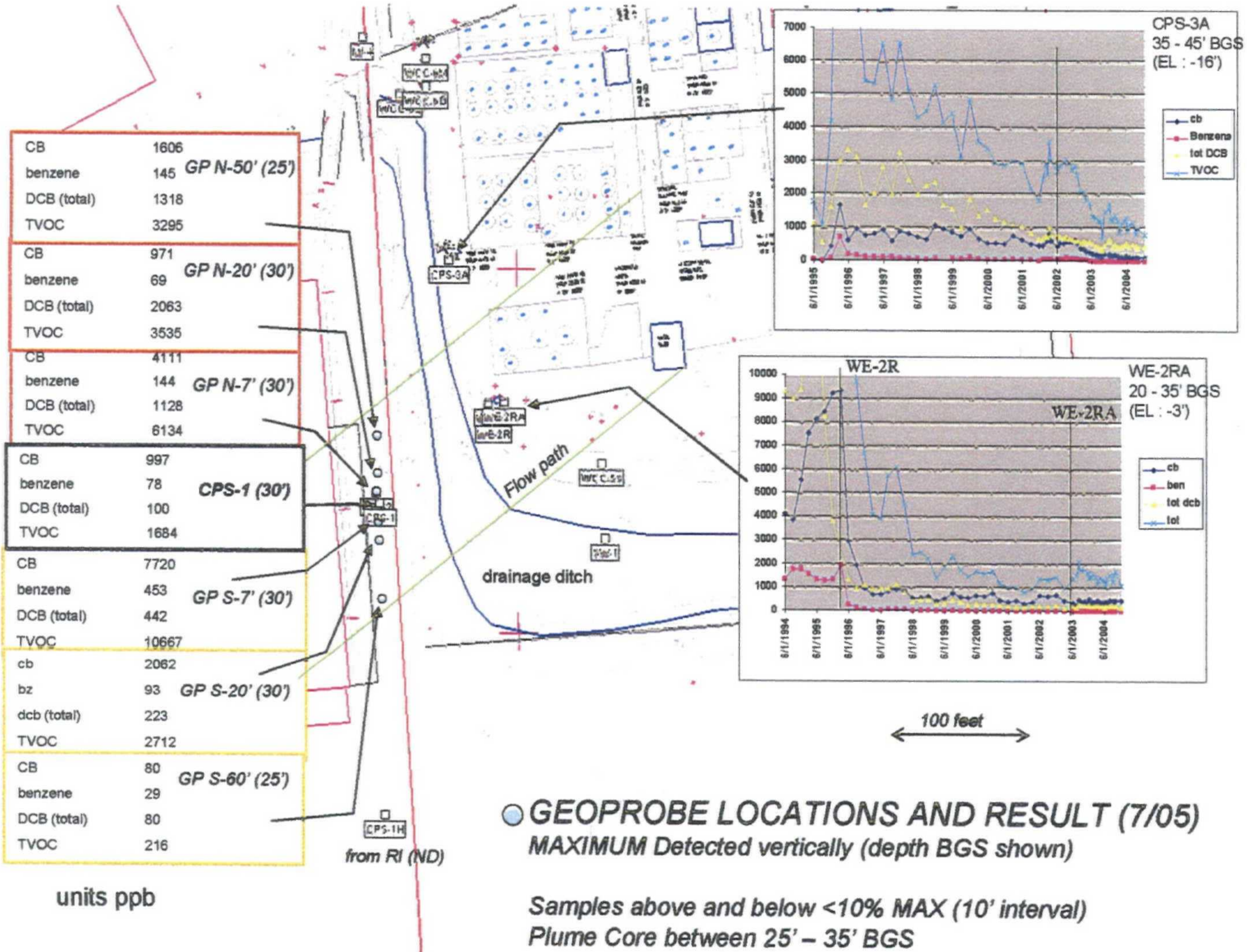

Figure 12 – Based on the result at CPS-1 (Figure 11), a geoprobe transect was taken as shown. The data shown represent the largest detect at each location, and this depth was consistently between 25 and 35 feet BGS. Note, most of the mass consists of CB, DCB and benzene. The water quality time-history at the two pumping wells is also shown. There is clearly a discrepancy in concentration magnitude on either side of the drainage ditch.

Combining the recent monitoring well data with the geoprobe result (Figure 12), a local CB plume map is presented in Figure 13. Note that not all the plume is shown to be captured by the MI pump-and-treat (RS-2A, B, C). This is based primarily on water quality data, where the CB concentration is 67 ppb at RS-2B and 2800 ppb at CPS-1, 500 feet upgradient. However, note that the concentration increase at CPS-1 occurred after 6/03 (see Figure 11), and that data shown in Figure 13 were collected approximately 18 months later. Because the distance between CPS-1 and RS-2B is approximately 500 feet and the groundwater velocity is assumed to be between 0.5 and 1 foot/day, the front associated with the observed increase may have yet to reach the MI pumping center.

A characterization of the flow path and contaminant distribution along the plume length can be achieved by combining time history water quality plots at spatially distributed monitoring points with pumping well operation data. This is because the operation of pumping wells perturbs the hydrologic system (i.e., deflects flow lines), and thus has the potential to affect the water quality monitoring record.

To this end, Figure 14 provides time history TVOC plots for several wells downgradient of the CPS Site. RW-1 is a former pumping well that operated until 1996. Other pumping wells that influence flow in the area are RW-4 and RS-2 (operation interval shown). The trend in contaminant levels can be attributed to effects from pumping, assuming that pumping affects the flow as shown. This interpretation supports the conclusion that the plume has historically been migrating between wells PA-B and WCC-12.

Figure 15 provides a similar analysis further downgradient. RW-2 and RW-5 are former pumping wells, their operation intervals shown. The data support the plume outline shown. The deflection of the plume toward PA-6 (Perth Amboy supply well) and away from the natural drainage (see Figure 5) is due to supply well extraction rates (totaling ~2.5 MGD).

An interpretation of the footprint of the CPS plume as it exists today is shown in Figure 16. This is derived from all the information presented previously. The outline is similar to that presented in the recent CPS PMP reports. The data show that the plume is about 30 feet BGS near the source, and as it travels toward the pumping center, it reaches depths of 60-80 feet BGS (at the elevation of the PA wells).

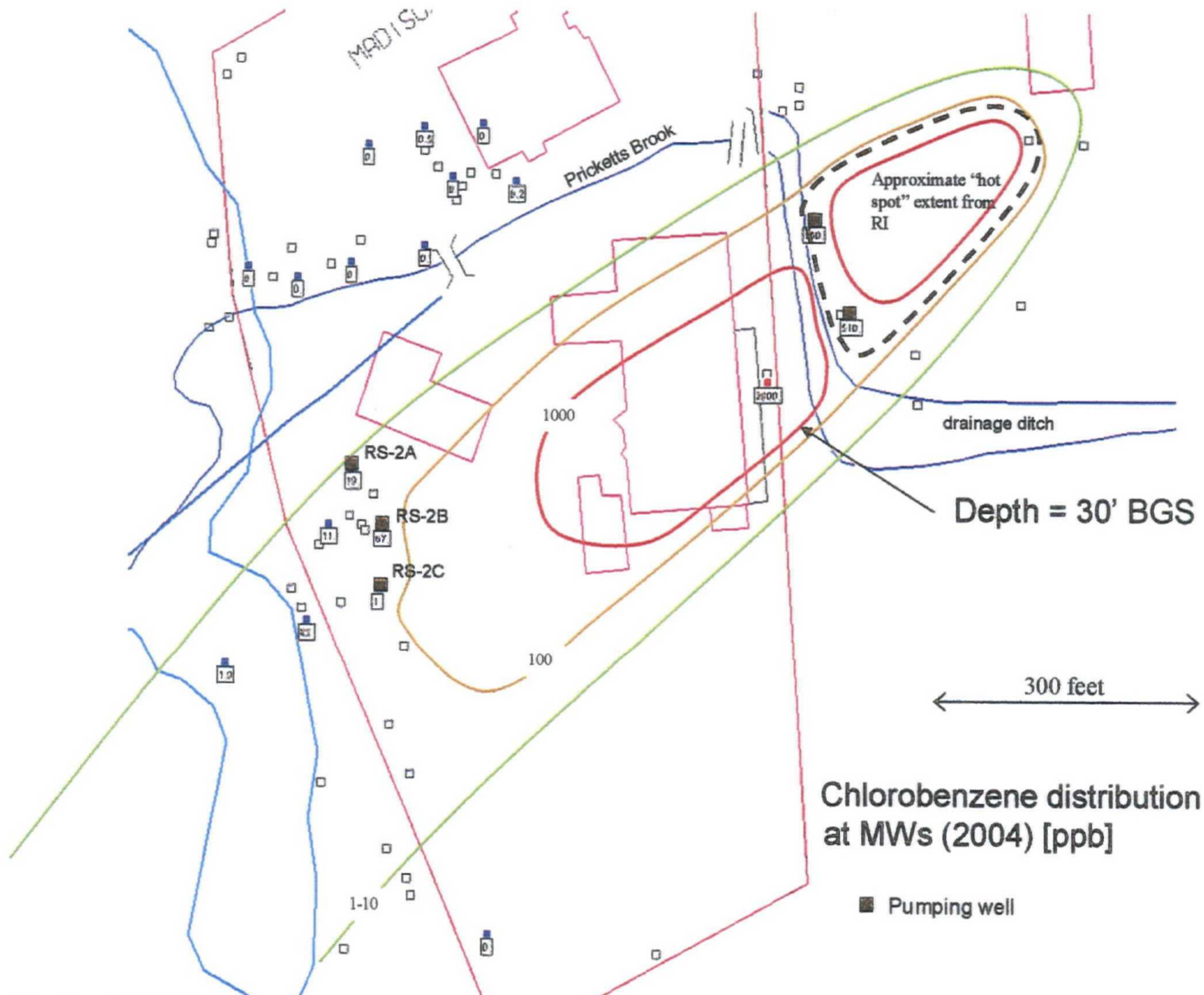

Figure 13 – Local CPS VOC plume characterization based on CB data, interpretation of groundwater flow, and source characterization. This is consistent with that shown in Figure 10.

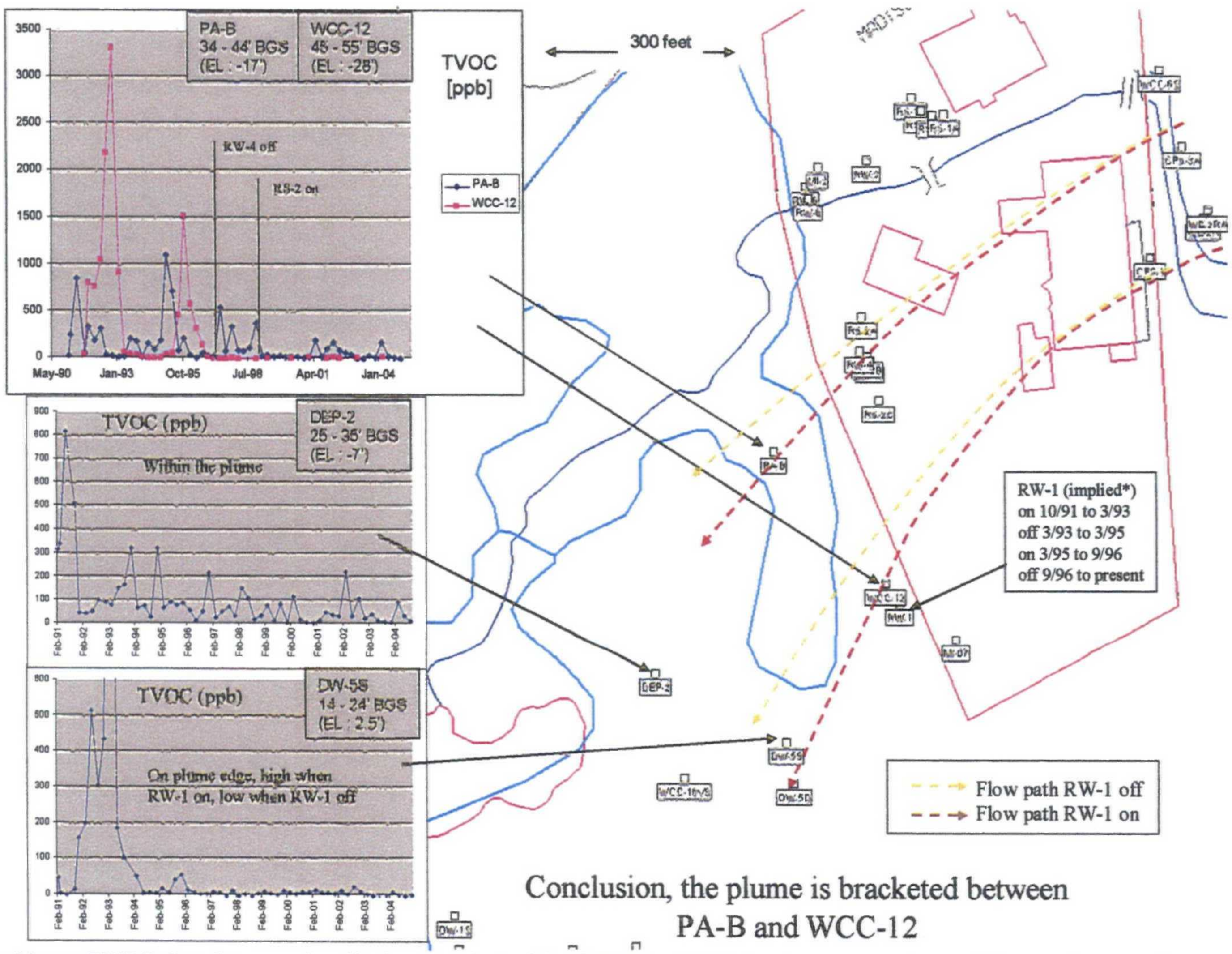

Figure 14 – Time history TVOC plots for several wells downgradient of the CPS Site. RW-1 is a former pumping well (*operation records not available). The trend in contaminant levels can be attributed to effects from pumping, assuming that pumping affects flow as shown. This interpretation supports the conclusion that the plume has historically been migrating between wells PA-B and WCC-12. The operation of pumping wells RW-4 and RS-2 is also indicated.

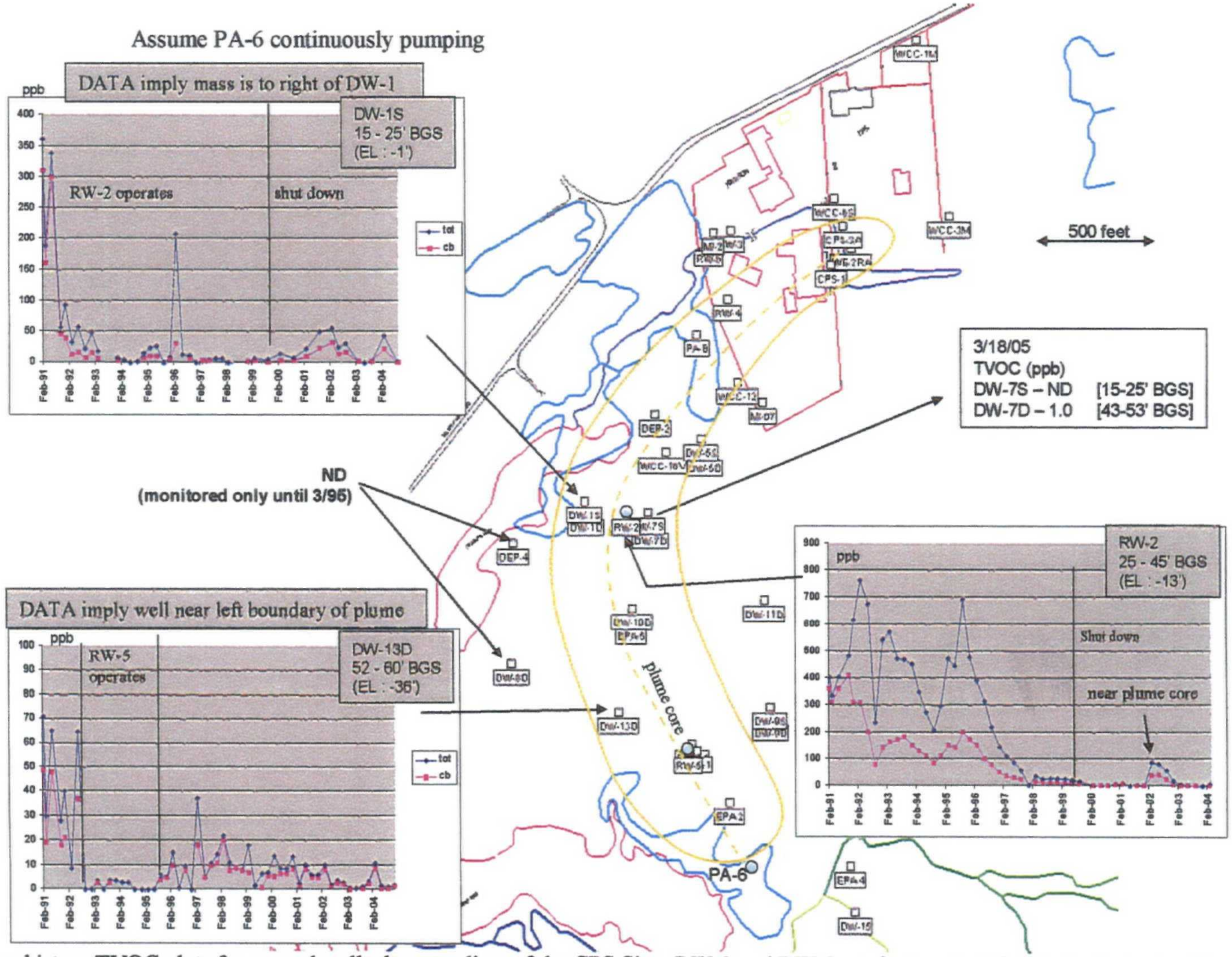

Figure 15 - Time history TVOC plots for several wells downgradient of the CPS Site. RW-2 and RW-5 are former pumping wells, their operation intervals shown. The data support the plume outline shown. The deflection of the plume toward PA-6 (Perth Amboy supply well) and away from the natural drainage (see Figure 5) is due to supply well extraction rates (totaling ~2.5 MGD).

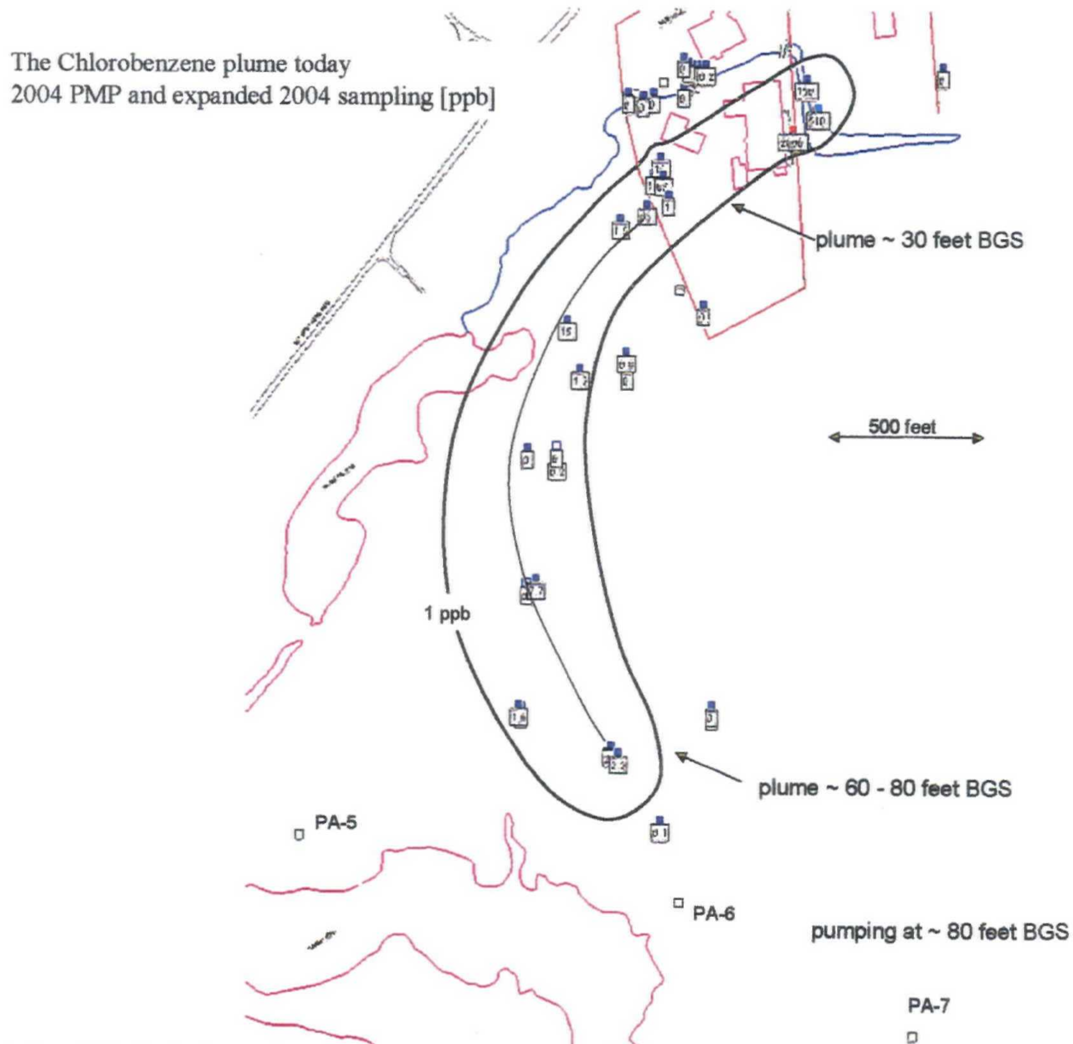

Figure 16 – The CB plume today. This is similar to that shown in the recent CPS PMP reports. The data show that the plume is about 30 feet BGS near the source, and as it travels toward the pumping center, reaches depths of about 80 feet BGS (at elevation of pumping wells).

7.1.6 Metals Plume Characterization

As discussed in Section 4, the metals plume is uniquely associated with the Madison Industries (MI) site. In particular, the following metals are associated with MI source areas: zinc, copper, lead and cadmium. Of these, the database suggests that the MI plume can be characterized by zinc, and copper can be considered a secondary characterization compound.

As with the VOC plume, the metals plume characterization is based on source area, hydrology and water quality data. Figure 17 provides a location map for the potential source areas and the locations of the current pumping system (10 wells). The data is from the 1996 RI report. Figure 18 shows the metals mass at selected extraction wells. Zinc is dispersed across the site, and copper is located predominately on the southern half. These data support the RI source area locations.

Figure 19 shows the occurrence of metals downgradient of the MI site, to the south of the drainage way (Pricketts Brook). While the wells just downgradient of the pumping center show attenuation resulting from capture (PA-B and WCC-11S), the off-axis wells do not (DEP-2, MI-7 and WCC-5S).

Figure 20 shows the available zinc data downgradient of the MI site, along the Pricketts Brook and Pond drainage way. While there has been marked attenuation at the far downgradient well (KA-1S), attenuation at the other wells is less clear, mainly because data are sparse. Note that KA-1S is a shallow well (albeit at an unknown depth). The high concentration implies that this well is in a groundwater discharge area.

Finally, putting together the data provided above with the conceptual model for groundwater flow provides the basis for the plume map shown in Figure 21. The distribution is shown as two plumes because of the source area distribution and the potential groundwater divide afforded by the Pricketts Brook.

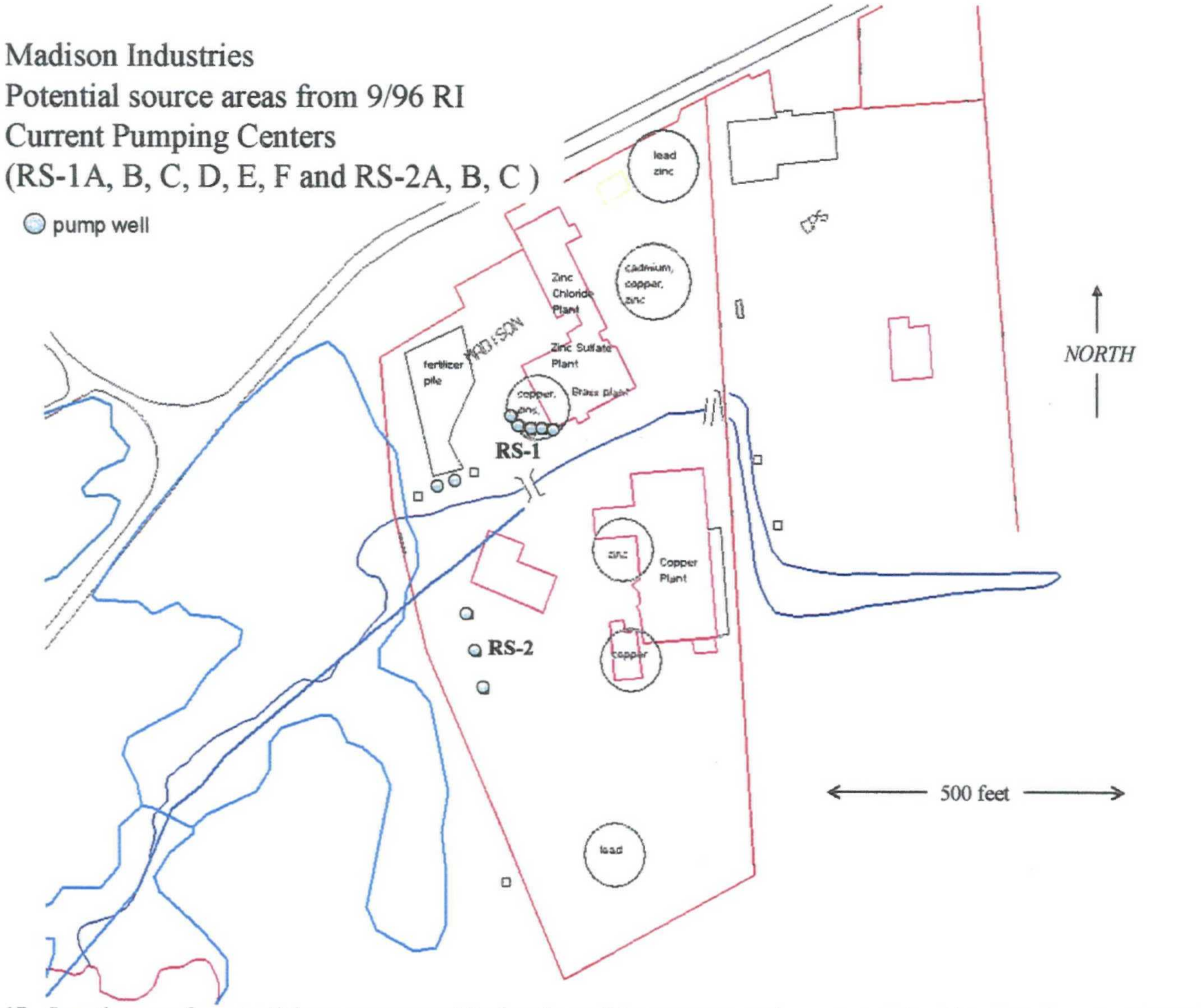

Figure 17 – Location map for potential source areas and the locations of the current pumping system (10 wells). Data form the 1996 RI.

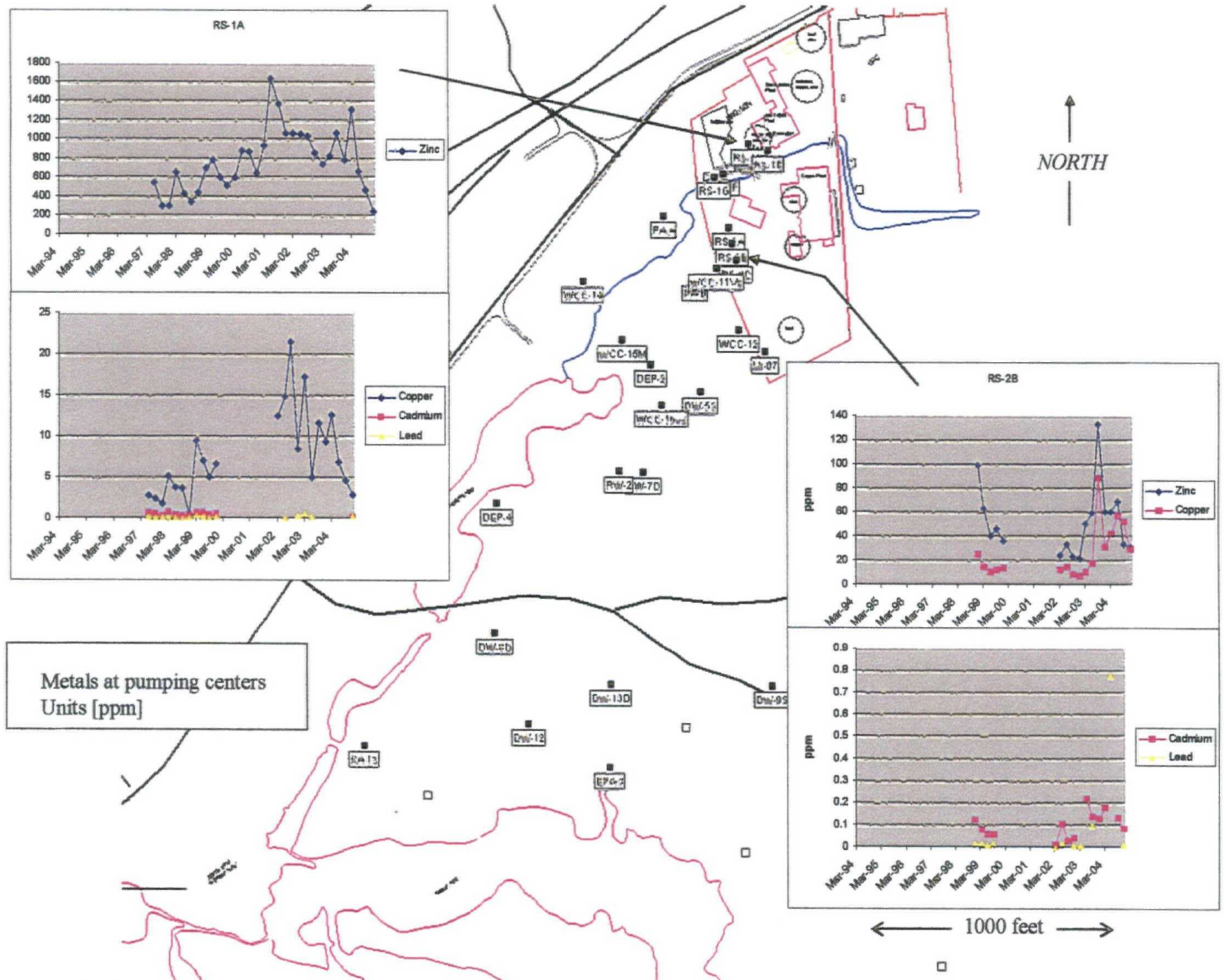

Figure 18 – Metals mass at selected extraction wells. Zinc is dispersed across the site, and copper is located predominately on the southern half.

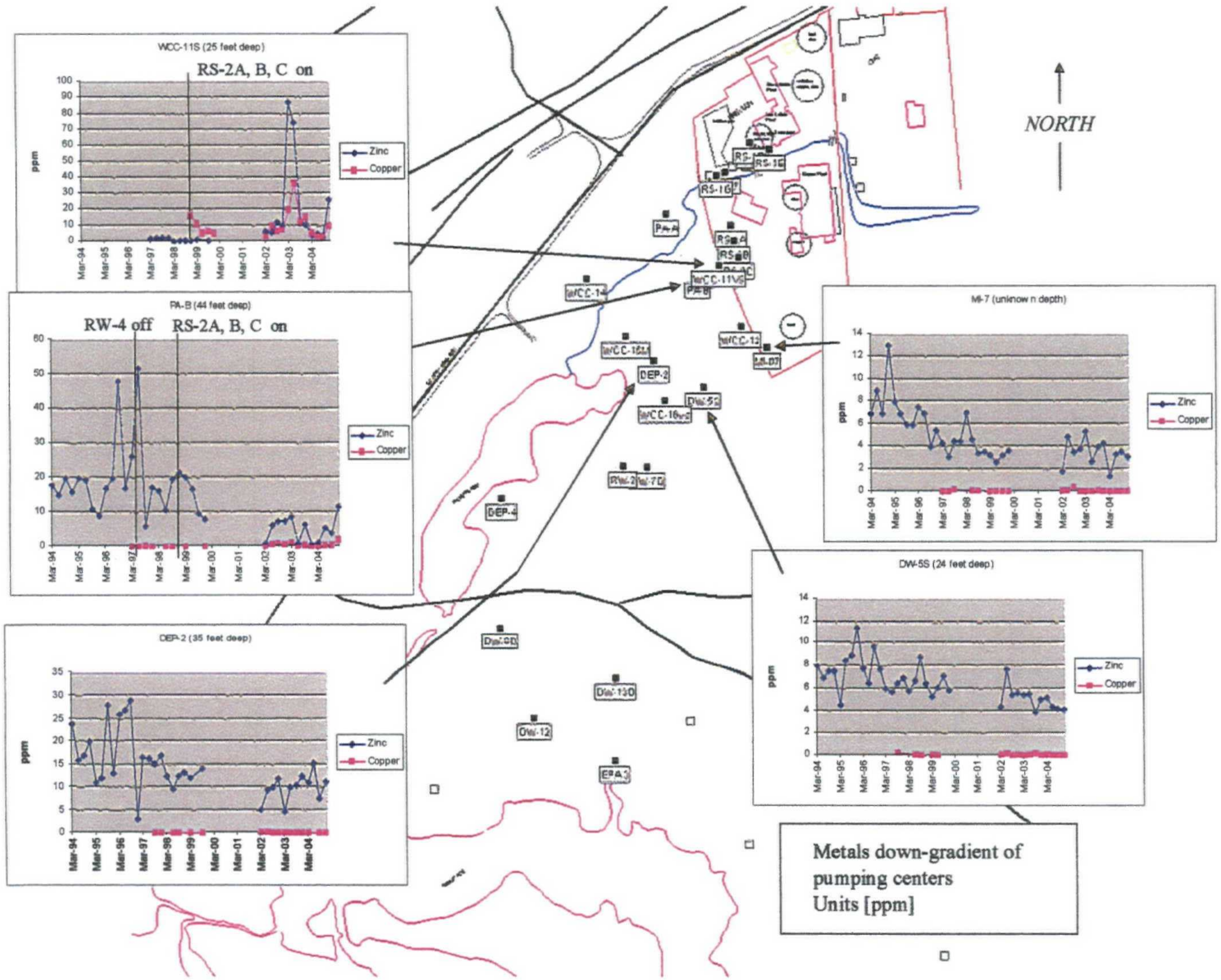

Figure 19 – The occurrence of metals downgradient of the MI site, to the south of the drainage way. While the wells just downgradient of the pumping center show attenuation resulting from capture (PA-B and WCC-11S), the off-axis wells do not (DEP-2, MI-7 and WCC-5S). Plot gaps indicate no data available.

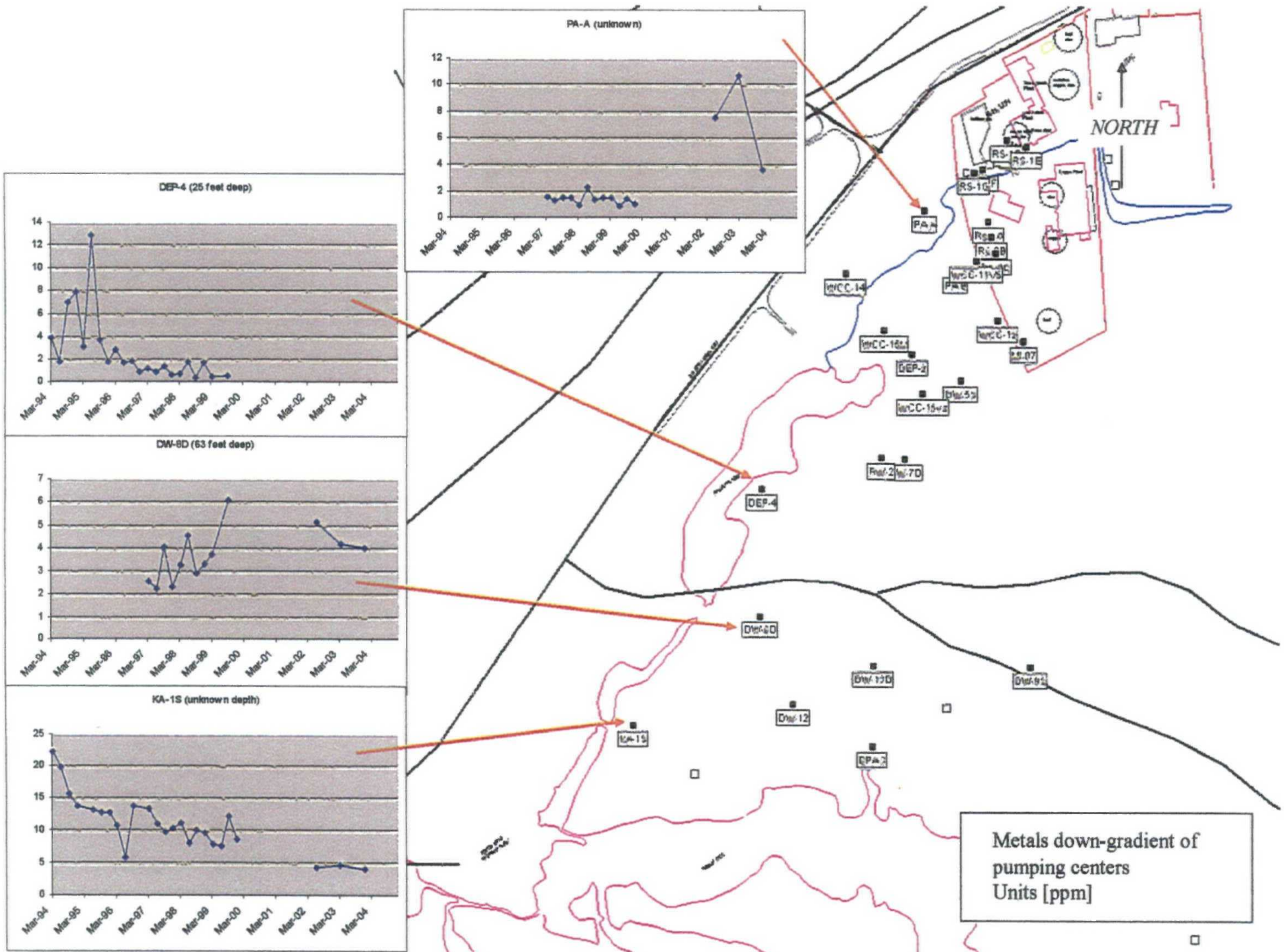

Figure 20 - The occurrence of metals downgradient of the MI site, along the drainage way. While there has been marked attenuation at the far downgradient well (KA-1S), attenuation at the other wells is less clear, mainly because data are sparse. Plot gaps indicate no data available.

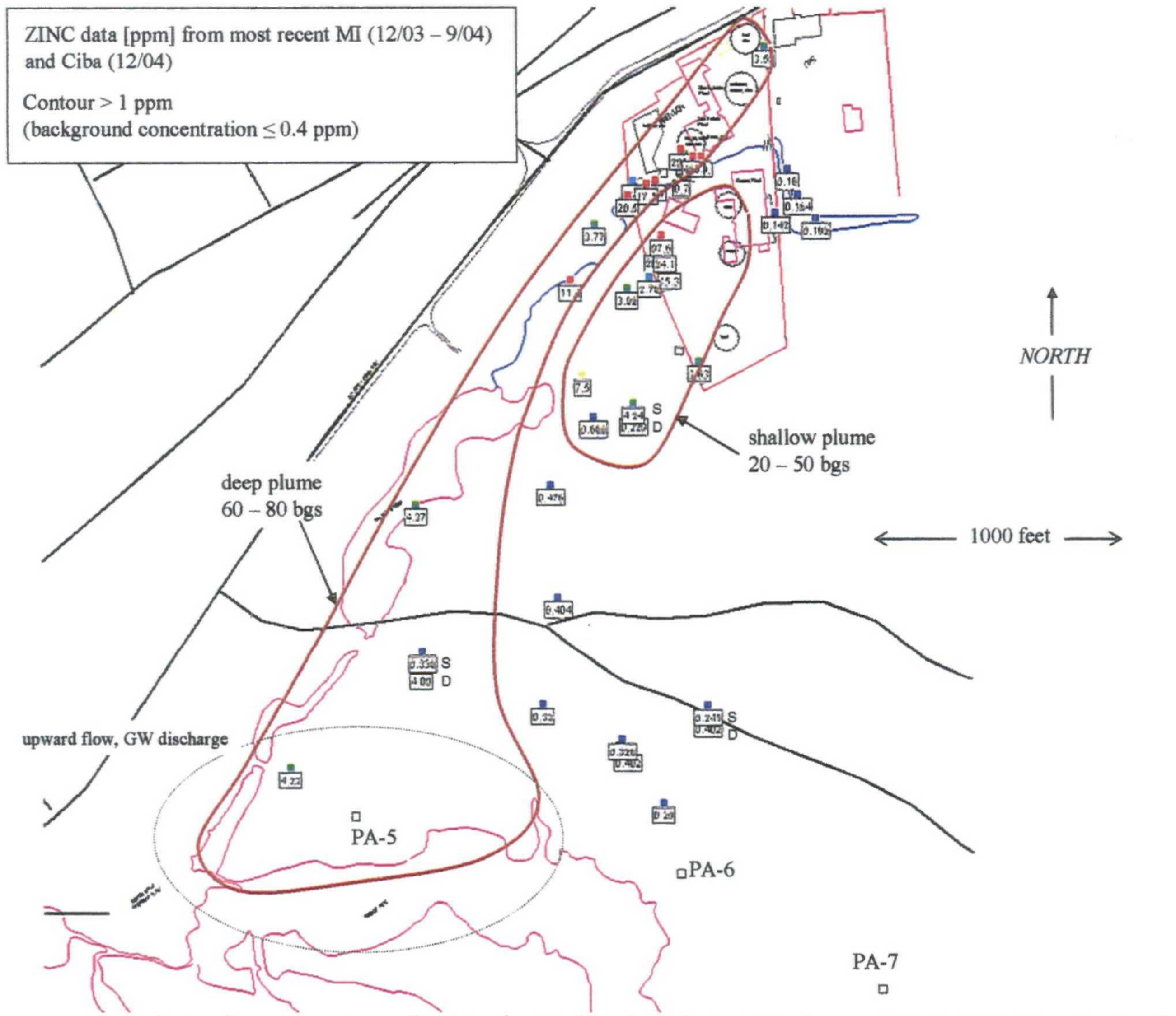

Figure 21 – Based source area, groundwater flow and water quality data, the MI zinc plume footprint is shown. Note that PA-5 is not active due to zinc contamination.

7.1.7 Effectiveness of Pump-and-Treat Systems

The CPS and MI pump-and-treat systems are extracting a substantial amount of mass as indicated by the concentrations measured over time (see Figures 12 and 18). In this regard, the P&T is providing a valuable service (mass extraction).

However, it is clear that a significant amount of VOC mass is crossing the CPS property line near CPS-1 (Figure 12). While these are similar compounds as are found in the extraction wells, based on concentration magnitude both in extracted groundwater and in the characterized source area, it is not clear whether this mass is associated with the characterized source area or is associated with an unknown source. Further investigation is required to characterize not only the capture character of the P&T system, but the source area as well.

With regard to the MI P&T, there is an insufficient amount of data to assess the capture efficiency. Clearly RS-2 wells are providing effective local capture. However, it appears that mass is getting by south of these wells. While the RS-1 wells are extracting high concentrations, there is insufficient data to support a capture characterization.

7.1.8 Conclusion

This section presented an analysis for characterizing the nature and extent of contamination associated with the CPS/Madison Site. The characterization was achieved by combining data relevant to source area characterization, hydrogeology, the time-history of aquifer stress conditions, and groundwater contaminant time trends. While the VOC plume and the metals plume characterizations were presented separately, the interpretations and assumptions used for both are self-consistent.

The VOC plume is assumed to be unique to the CPS Site. The following conclusions are drawn from the analysis (pending further investigation):

- The plume is characterized spatially by chlorobenzene.
- Distribution of CPS mass is consistent with identified source area, groundwater flow and water quality data.
- There is significant VOC mass (CB, DCB, Benzene) crossing CPS property line near CPS-1.
- MI P&T (wells RS-2) does not appear to be capturing the entire CPS plume.

- Additional characterization is warranted for source and transport of mass found near CPS-1.
- Current CPS P&T is capturing the EPLC VOC plume.
- There is no evidence of metals contamination on CPS property.

The metals plume is assumed to be unique to the MI Site. The following conclusions are drawn from the analysis (pending further investigation):

- Zinc is the primary fingerprint compound which defines plume distribution.
- The capture system is removing significant mass (zinc and copper).
- Mass may be getting by the RS-2 group wells to south.
- Offsite contamination is attenuating.
- Metals contamination does not appear to be affecting supply wells 6 and 7, and appears to affect well 5.
- No evidence of metals contamination on CPS property (up-gradient).
- MI P&T is capturing VOC mass from EPLC and CPS.

Additional data needs to be collected to fill data gaps and verify the conceptual model for contaminant source, transport and fate.

7.2 Source Area Soil Characterization

As discussed in previous sections, the CPS RI was completed in three phases (Phase I, Phase II and Phase III). A Draft Feasibility Study was submitted by Ciba in May of 2001. As a result of the RI and FS, contaminated soils were delineated in all areas of the site except for soils beneath the tank farms on the site. Plant operations prevented access to tank farm soils during the RI and FS and were therefore only sparsely characterized. However, the plant closed in 2001 and operations in the tank farm ceased thereby opening access to tank farm subsurface soils for the 2003 additional soil and source area characterization.

Ciba Specialty Chemicals Inc. submitted a Sampling and Analyses Work Plan to the New Jersey Department of Environmental Protection (NJDEP) on July 28, 2003. NJDEP approved the work plan and an initial phase of the work plan was implemented in October 2003. A second phase of fieldwork was conducted in December 2003. The purpose of these field activities was to collect additional soil samples from source areas beneath the site to provide additional characterization of soils beneath the tank farm areas. The data supplemented the previously collected RI / FS data.

A total of 28 borings were conducted at the site in 2003. 129 soil samples were collected during the two phases. The initial round of sample collection was conducted by A.C. Shultes, Inc. using split-spoon sample collection methods. The second round of sample collection was done by CT & E, Inc. using geoprobe coring techniques. The split-spoons and cores were screened with a handheld Photo Ionization Detector (PID) to locate the highest concentration along the 2-foot core. Samples were collected from the 1-foot interval that emitted the highest VOC screening results. Note that utilization of this screening technique results in the collection of samples that are biased high in relation to the full length of the spoon. All samples collected were extracted with methanol in the field and sent to Lancaster Laboratory for analysis by EPA Method SW846 – 8260. Samples were collected from depths as deep as 72 feet below land surface. Most sample collection focused on the upper 20 feet of soil beneath the site. Six of the 28 borings penetrated deeper than 20 feet.

For ease of review, please note that the figures for this section are included within the section.

Boring locations for all source area and soil samples are depicted on Figure One in plan view. A cross section oriented with a south to north view is presented in Figure Two. The cross section shows color coded sample locations. Figure Three is a three dimensional view of the color coded sample locations oriented with a south to north view of sample locations and color coded TVOC concentrations. The water table is very shallow at the site. Depending on rainfall, the water table varies from near land surface to only a few feet below land surface. The greatest mass of contamination is located at shallow depths (within 10 to 15 feet below land surface). A summary table of all soil data is presented in Table One. An examination of the data in Table One indicates BTEX compounds, chlorobenzene and dichlorobenzenes are the most commonly detected compounds at the site.

The source area is depicted on Figure One. It contains approximately 30,000 cubic yards of material with TVOC concentrations between 10 mg/kg to 100 mg/kg. Approximately 10,000 cubic yards of material is between 100 mg/kg and 1000 mg/kg. There is about 500 cubic yards of material greater than 1000 mg/kg. Volumes were determined using a geostatistical block model.

FIGURE ONE
CPS SOURCE AREA BASED ON GEOSTATISTICS
PLAN VIEW OF BLOCK MODEL

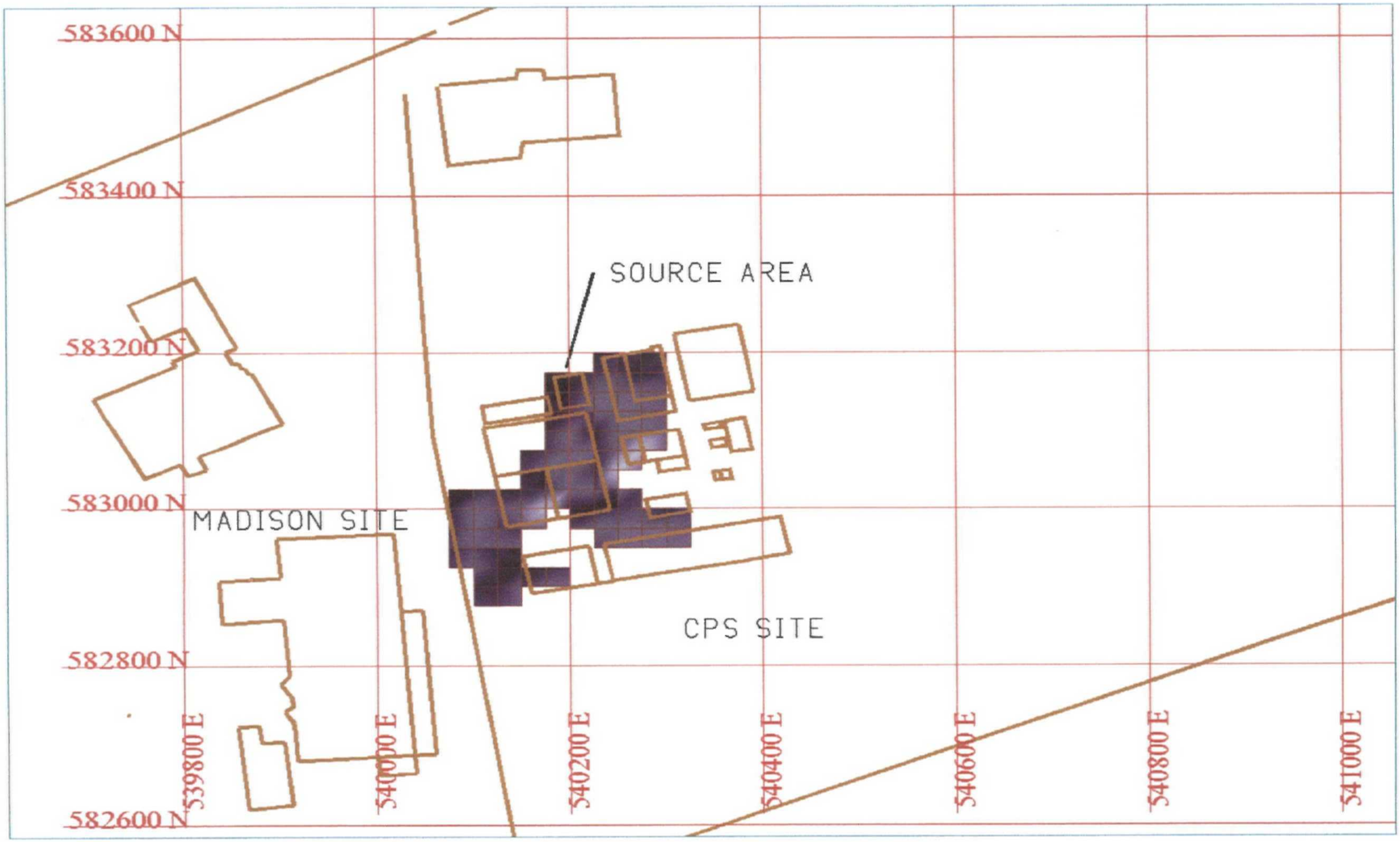

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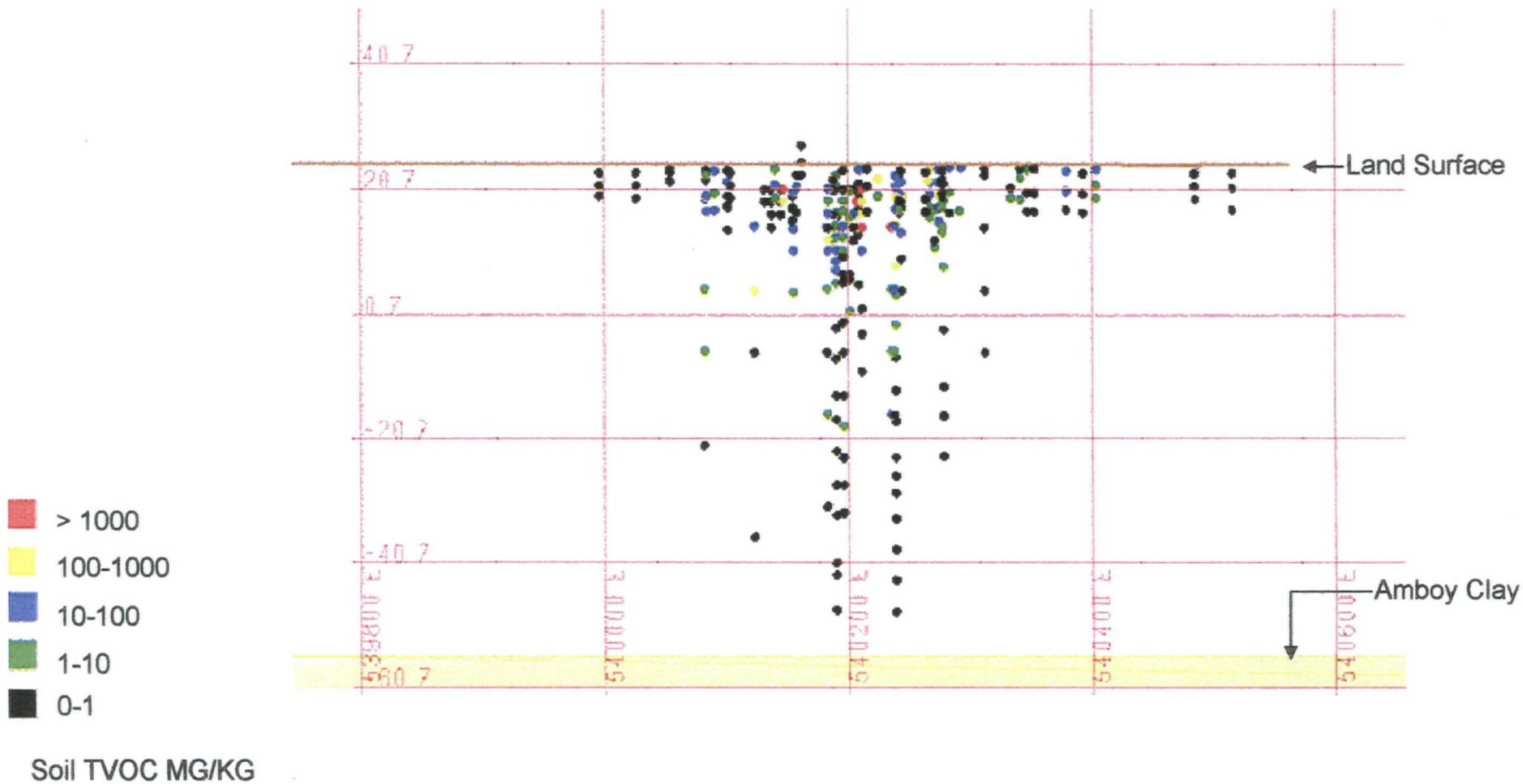
FIGURE TWO
CPS SITE
Cross Section of Color-Coded TVOC Soil Samples



South to North Cross Section

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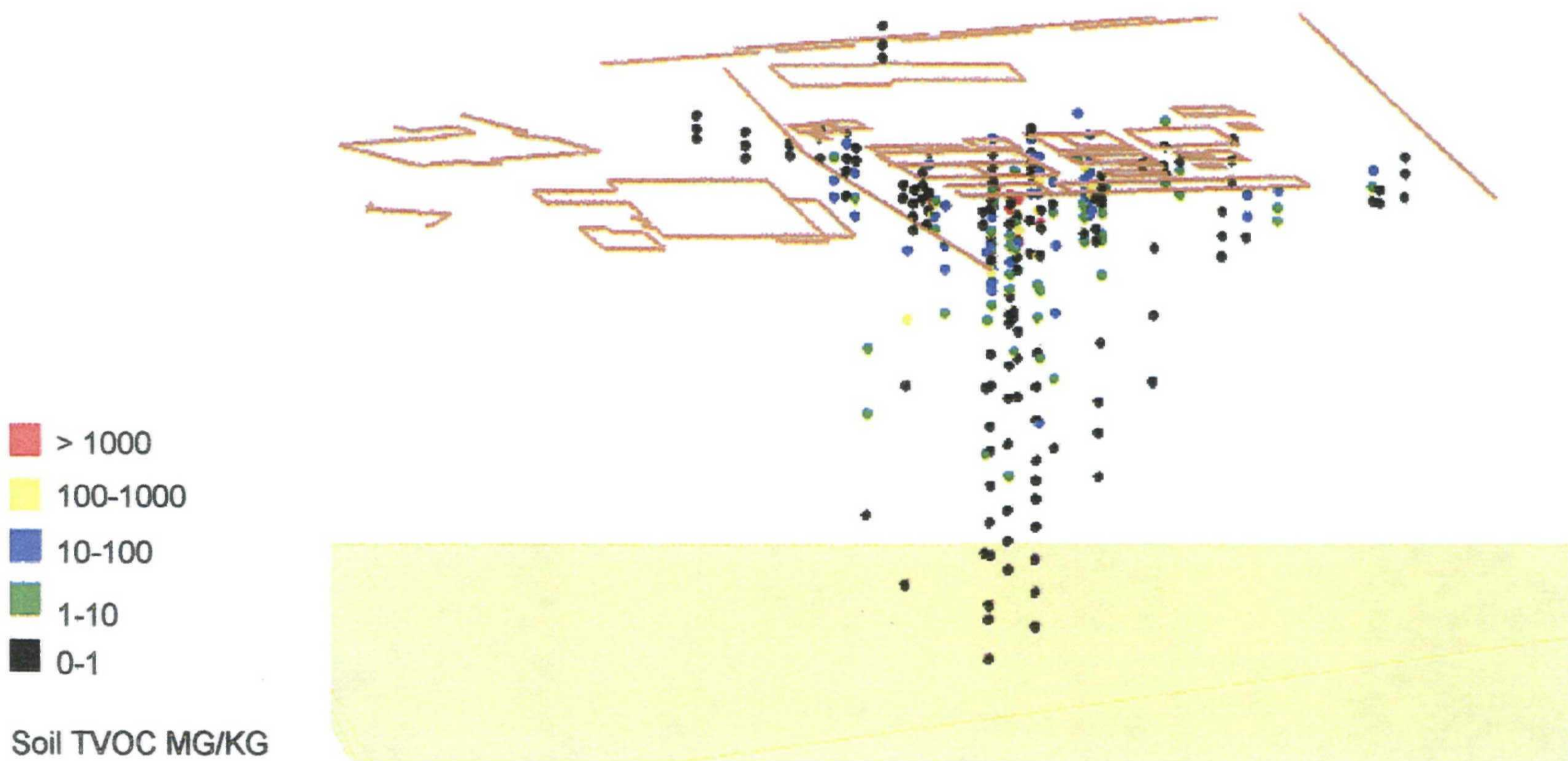
FIGURE THREE
CPS SITE
3D Grid of of Color-Coded TVOC Soil Samples



3.gif

TABLE ONE

Statistical Summary Of Source Characterization Data

Chemical Name	Detected %	Max Result mg/kg	Mean mg/kg	MCL mg/l	NJDEP IGWSCC mg/kg
TOLUENE	58	2200	25.09	1	500
XYLENE (total)	46	550	8.00	1	10
ACETONE	40	45	1.93	0.7	100
CHLOROBENZENE	34	310	2.65	0.05	1
ETHYLBENZENE	30	77	1.64	0.7	100
1,2-DICHLOROBENZENE	28	2800	26.18	0.6	50
1,4-DICHLOROBENZENE	27	220	2.04	0.075	100
BENZENE	18	98	0.85	0.001	1
METHYLENE CHLORIDE	14	350	4.73	0.003	1
CIS-1,2-DICHLOROETHENE	10	150	2.49	0.07	1
1,3-DICHLOROBENZENE	10	27	0.67	0.6	100
TETRACHLOROETHENE	8	19	0.93	0.001	1
TRICHLOROETHENE	8	1200	13.45	0.001	1
1,2-DICHLOROETHANE	7	45	1.20	0.002	1
1,1,2,2-TETRACHLOROETHANE	3	17	0.05	0.001	1
TRANS-1,2-DICHLOROETHENE	3	5.8	0.10	0.1	50

Additional source area characterization is planned for 2006, and will be described in the Supplemental RI/FS Work Plan which is scheduled to be submitted December 5, 2005.

7.3 Demolition of Production Facilities

Demolition of the plant production facilities has been completed. The site office building/laboratory and a plant warehouse remain, as do the IRM groundwater treatment facilities. Ciba is currently marketing the property.

8.0 Future Activity

As required by the Administrative Order on Consent, a revised RI/FS Work Plan will need to be submitted to the USEPA within 60 days of the effective date (October 6, 2005). The revised RI Work Plan will identify the existing data gaps in our understanding of the groundwater plume and the on-site and off-site source area contributions. The revised FS work plan will address efforts to investigate any new applicable and appropriate technologies which address the currently established Preliminary Remedial Goals

9.0 PRIMARY REFERENCES

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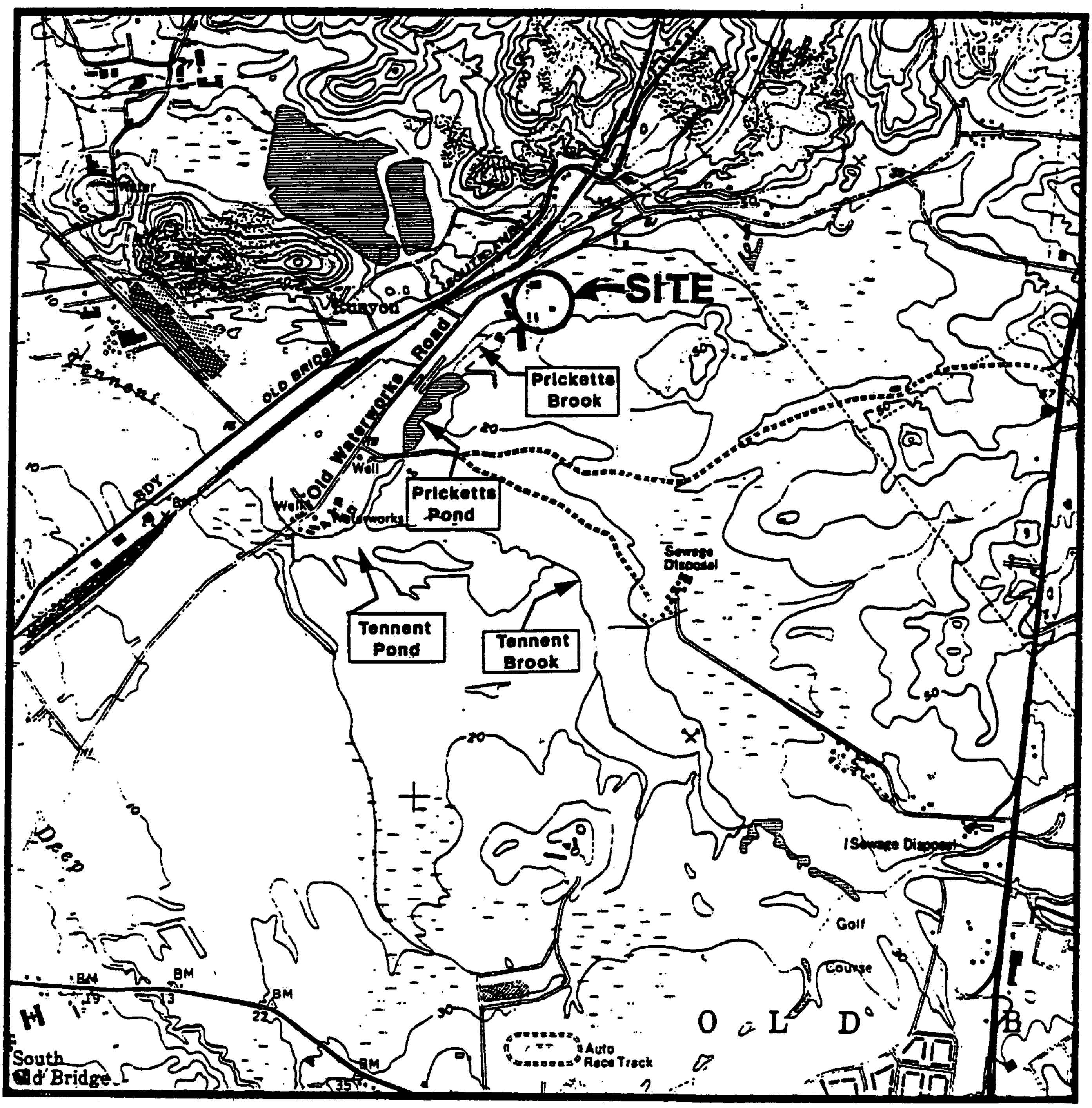
F I G U R E S



SOUTH AMBOY QUADRANGLE, N.J. - N.Y.
7.5 MINUTE SERIES
1981

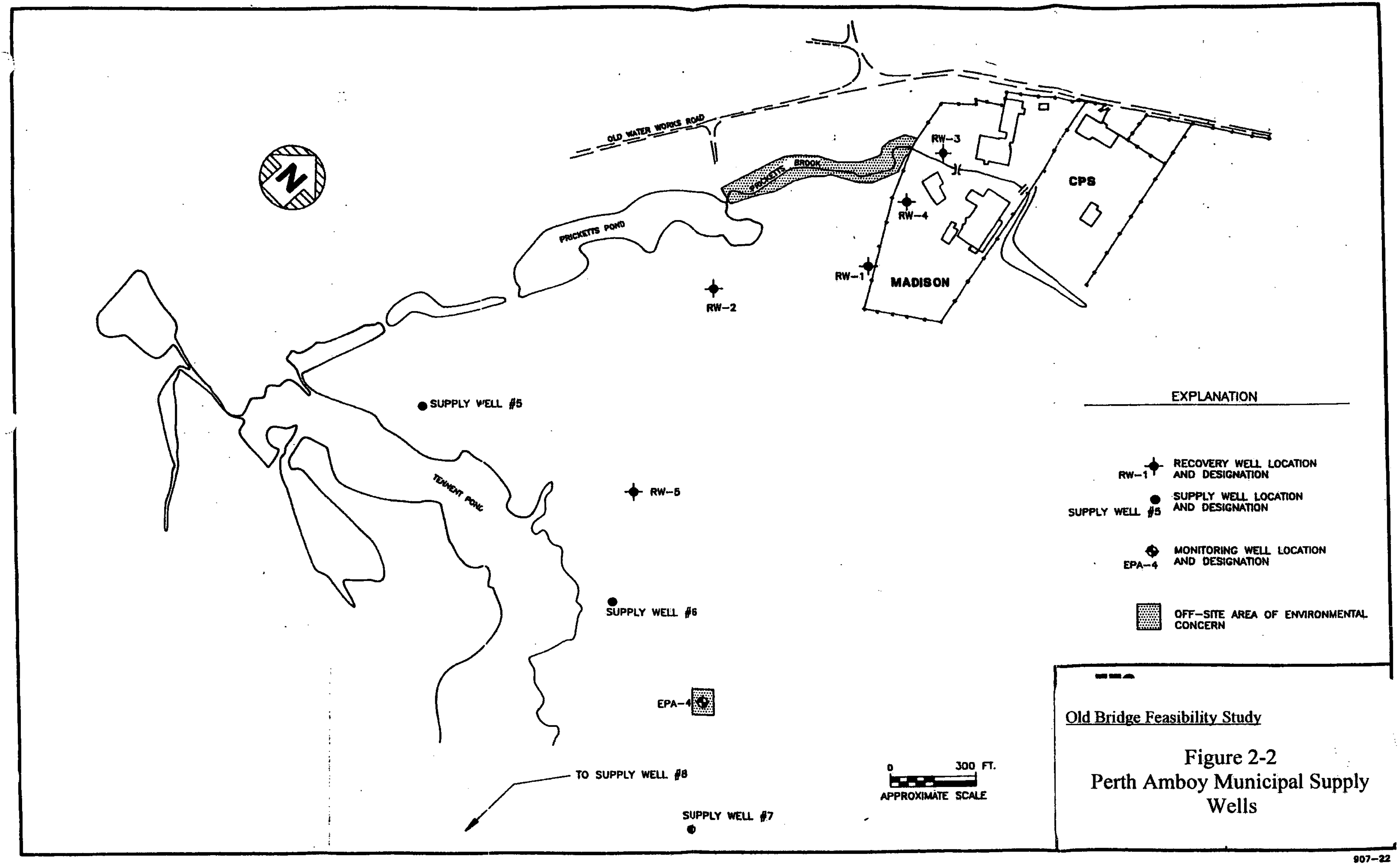
0 2000 FT.
APPROXIMATE SCALE

N

Old Bridge Feasibility Study

Figure 2-1
Site Location

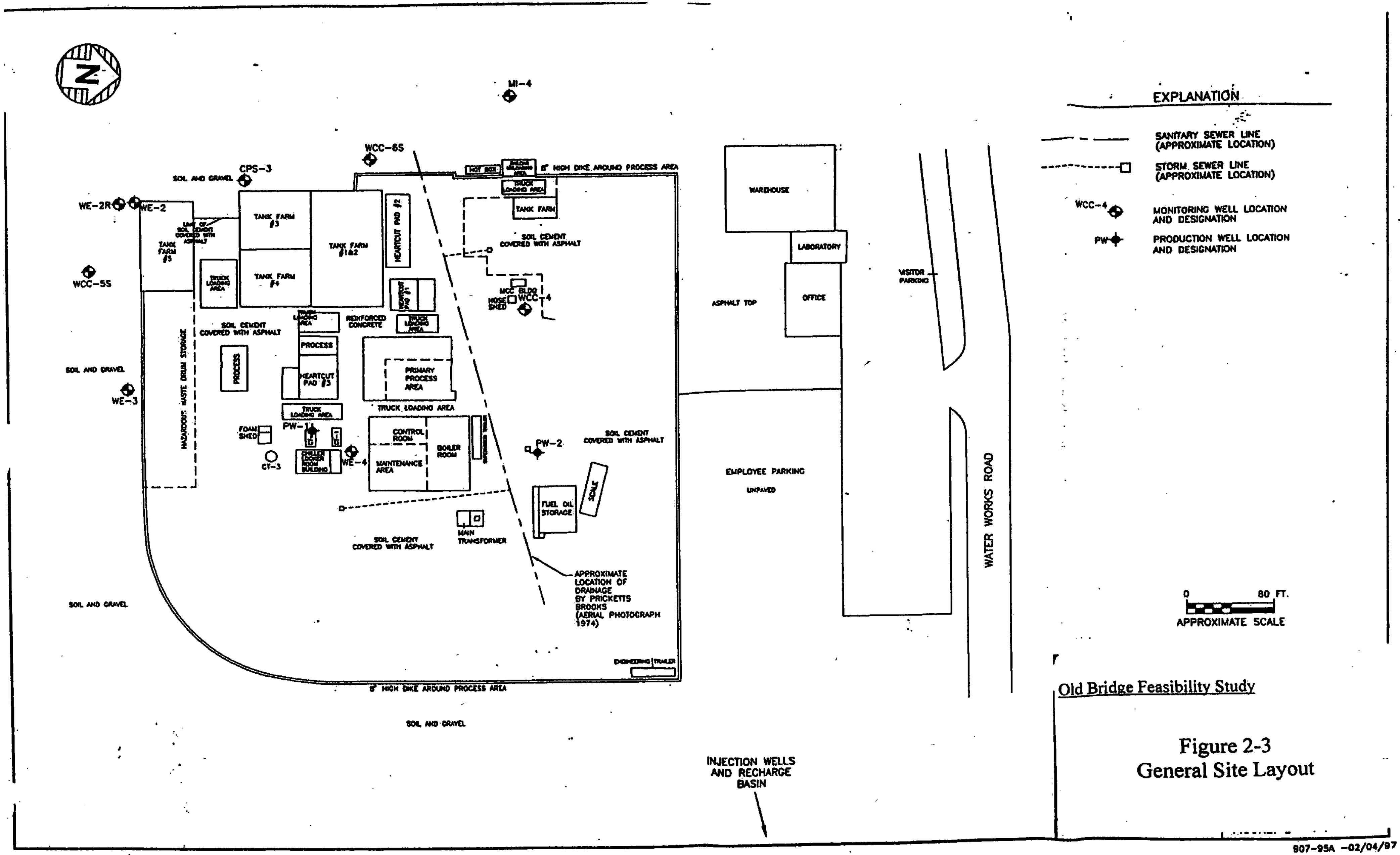
127138



Old Bridge Feasibility Study

Figure 2-2
Perth Amboy Municipal Supply Wells

907-22

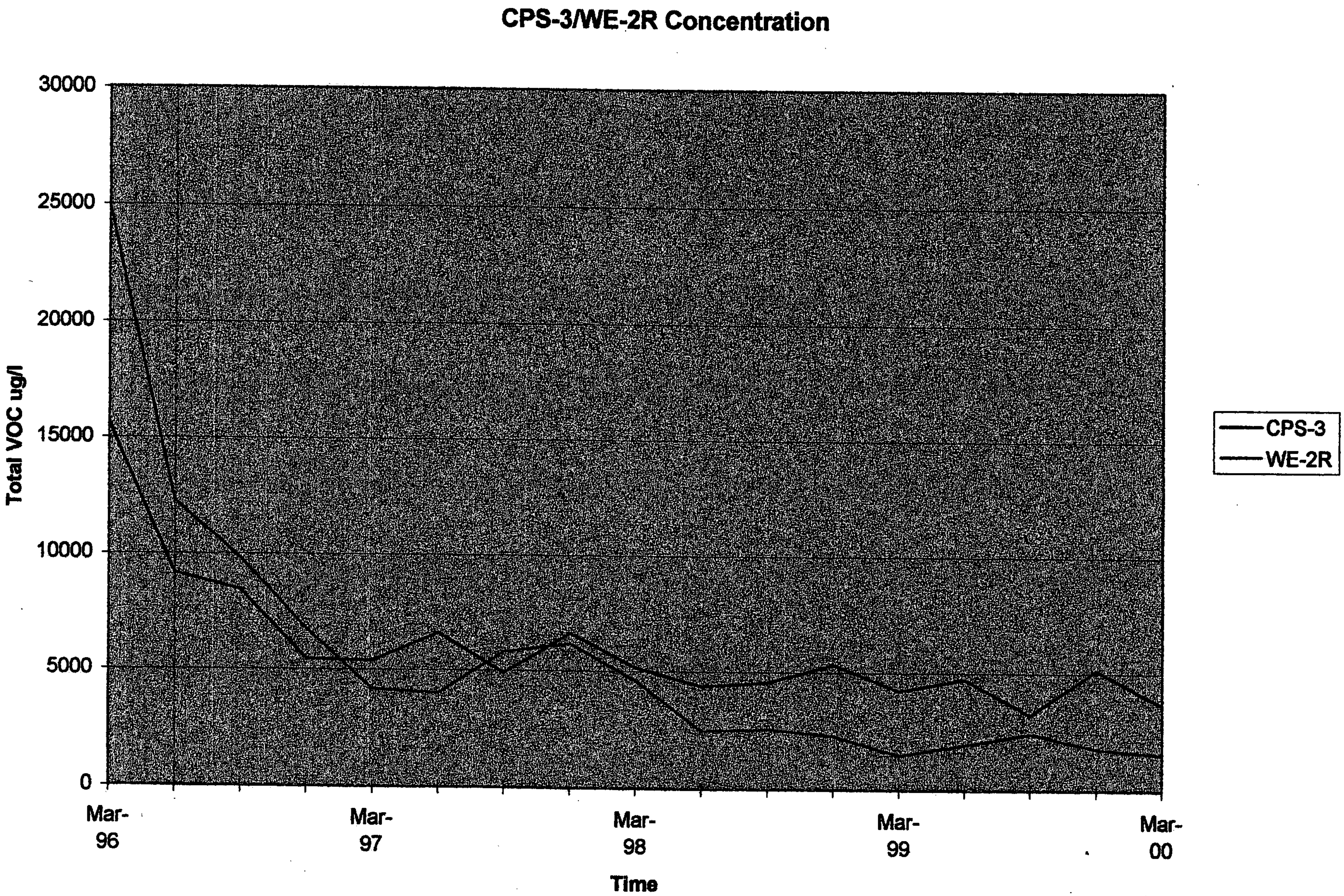


Old Bridge Feasibility Study

Figure 2-3
General Site Layout

807-95A -02/04/97

Figure 2-4


CPS-3/WE-2R Concentration
30000
25000
20000
15000
10000
5000
0
Total VOC ug/l
Mar-96
Mar-97
Mar-98
Mar-99
Mar-00
Time
CPS-3
WE-2R

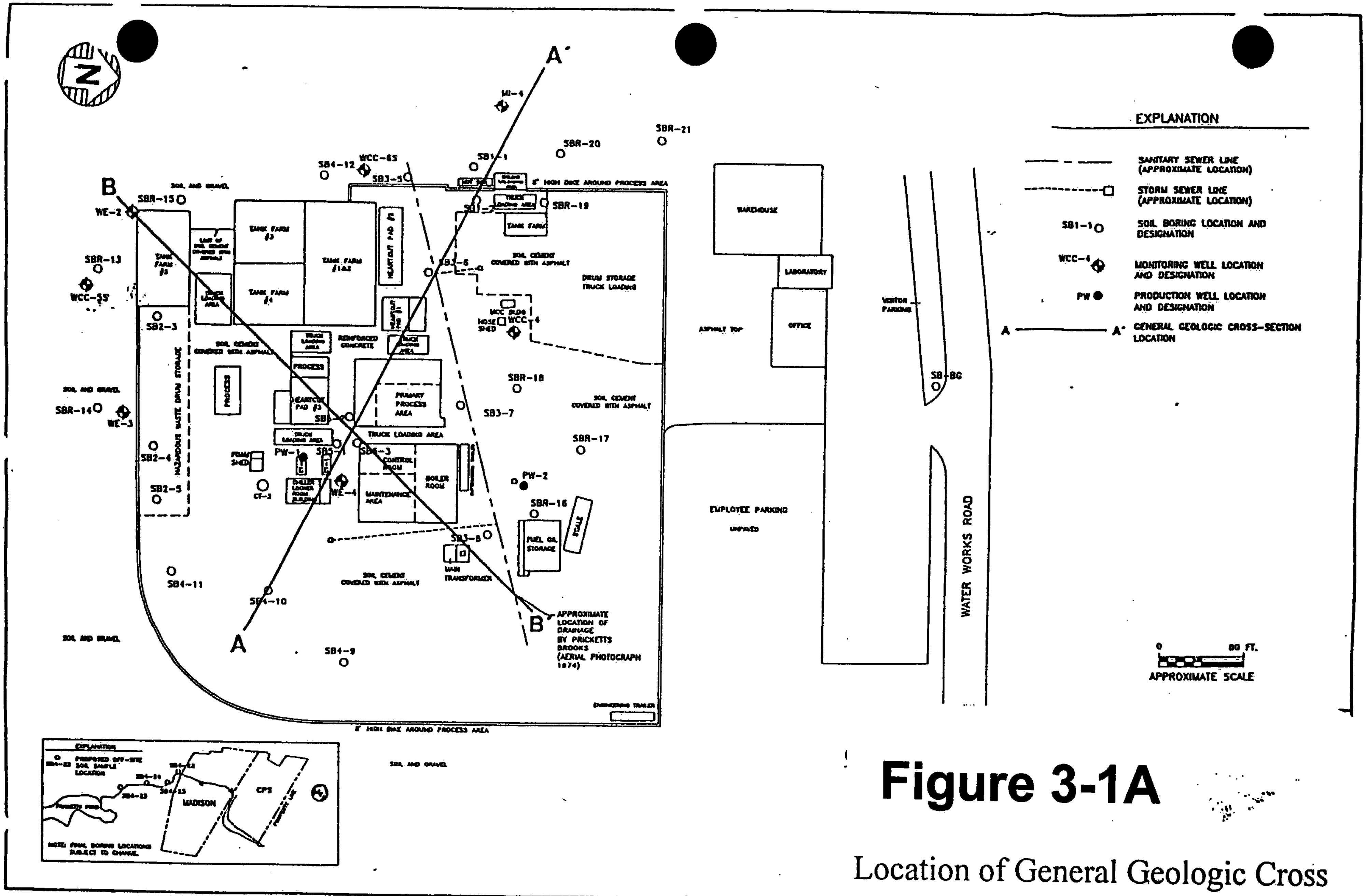


Figure 3-1A

Location of General Geologic Cross Section

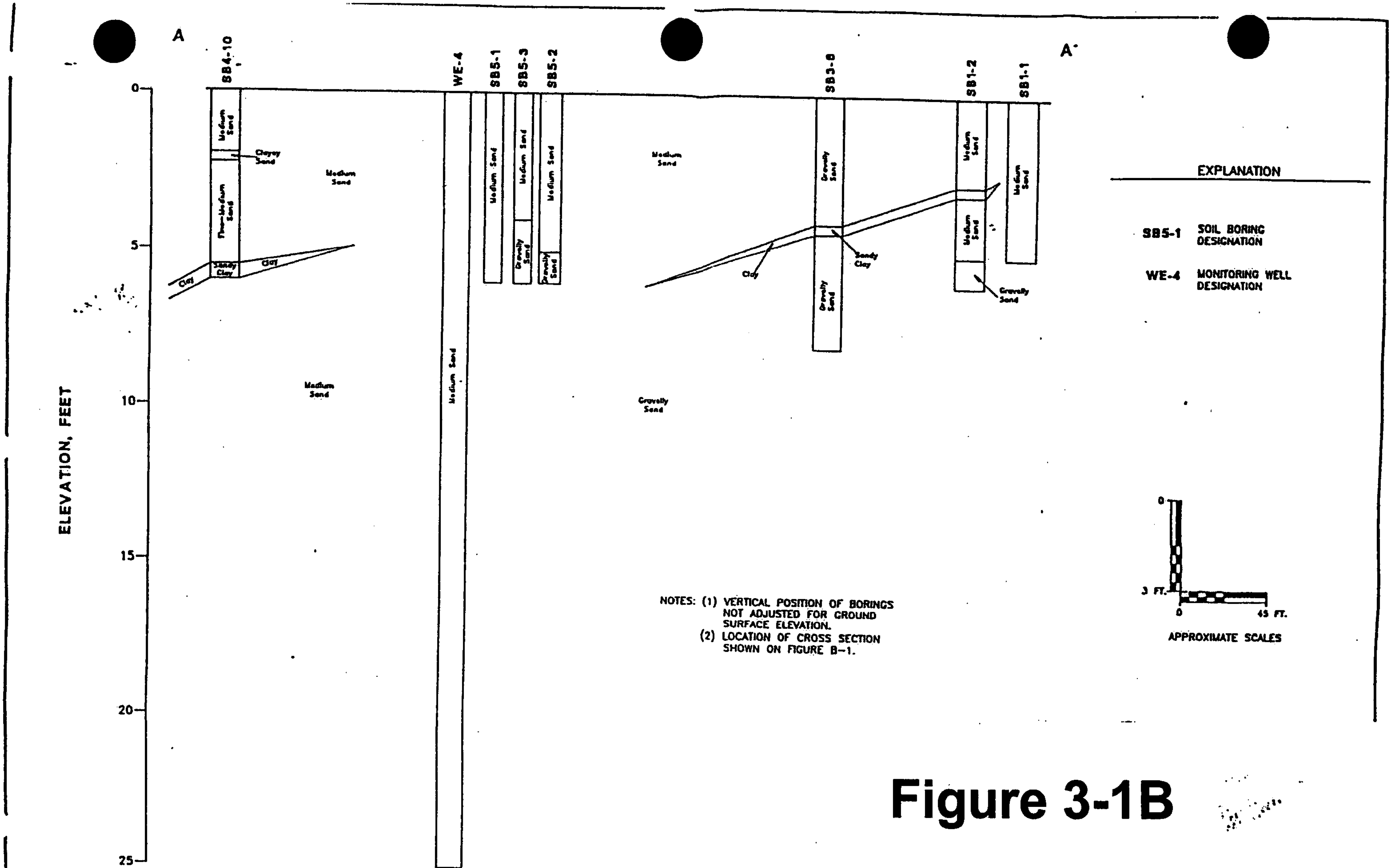


Figure 3-1B

General Geologic Cross Section A-A

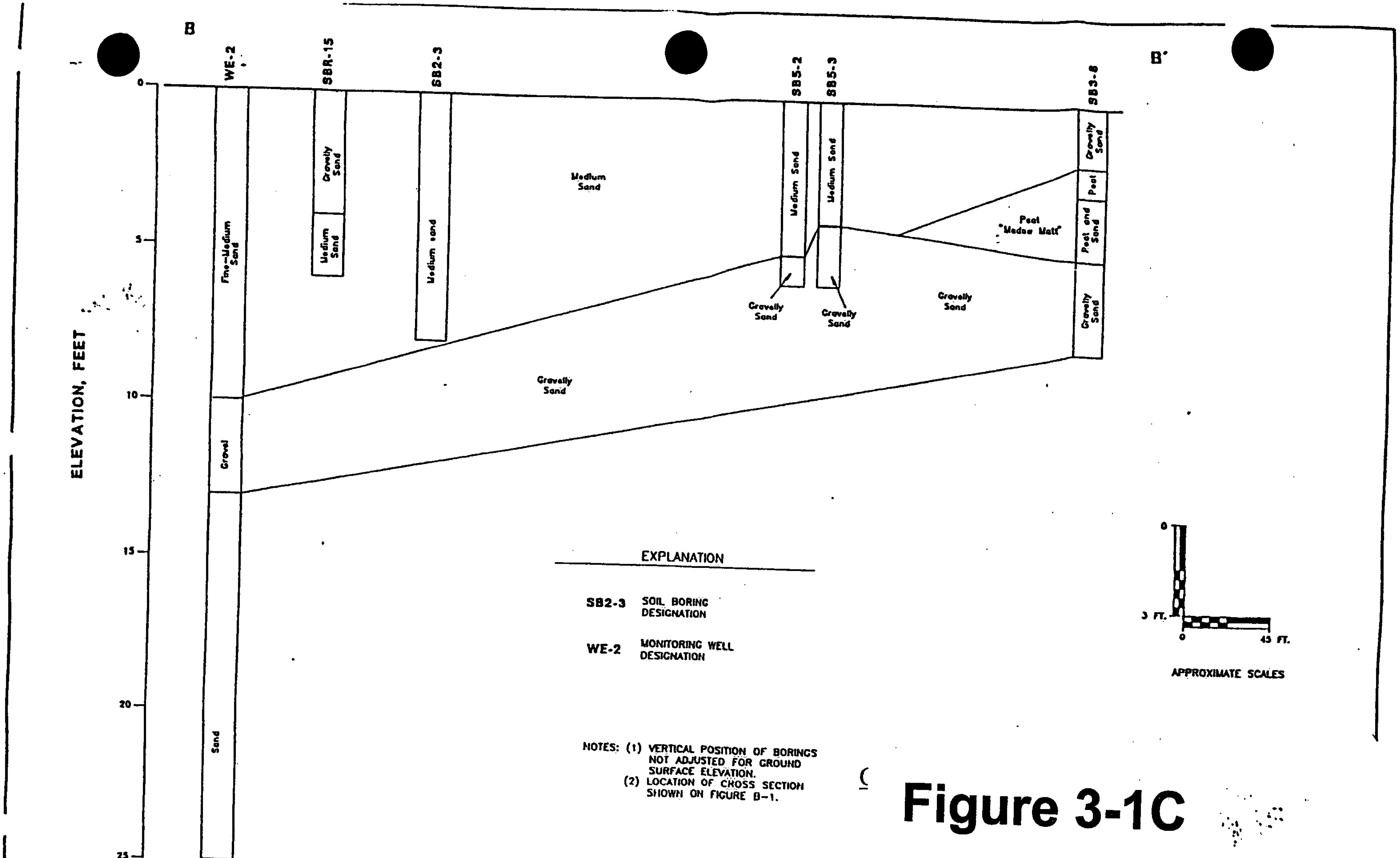


Figure 3-1C

General Geologic Cross Section B-B

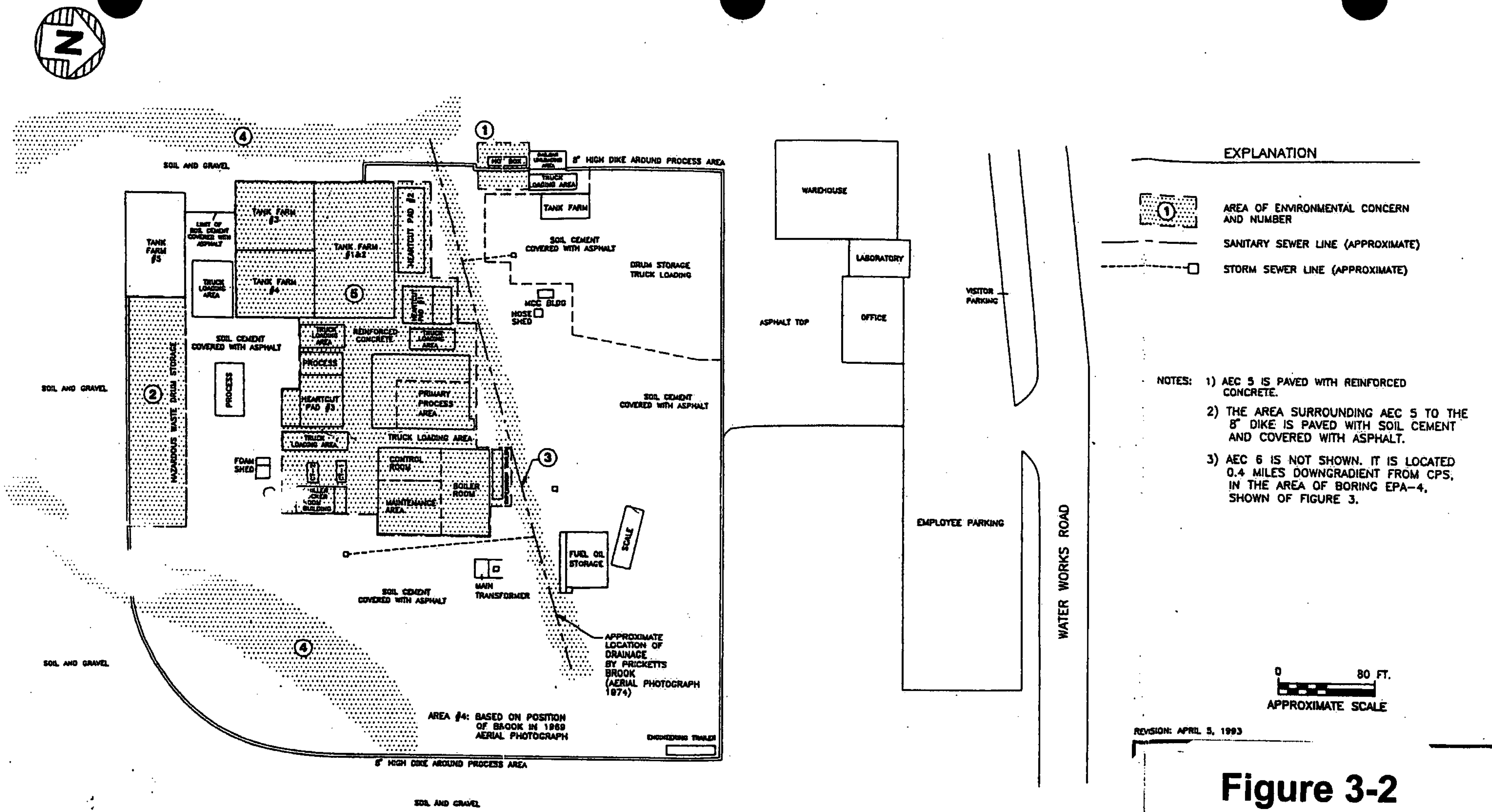
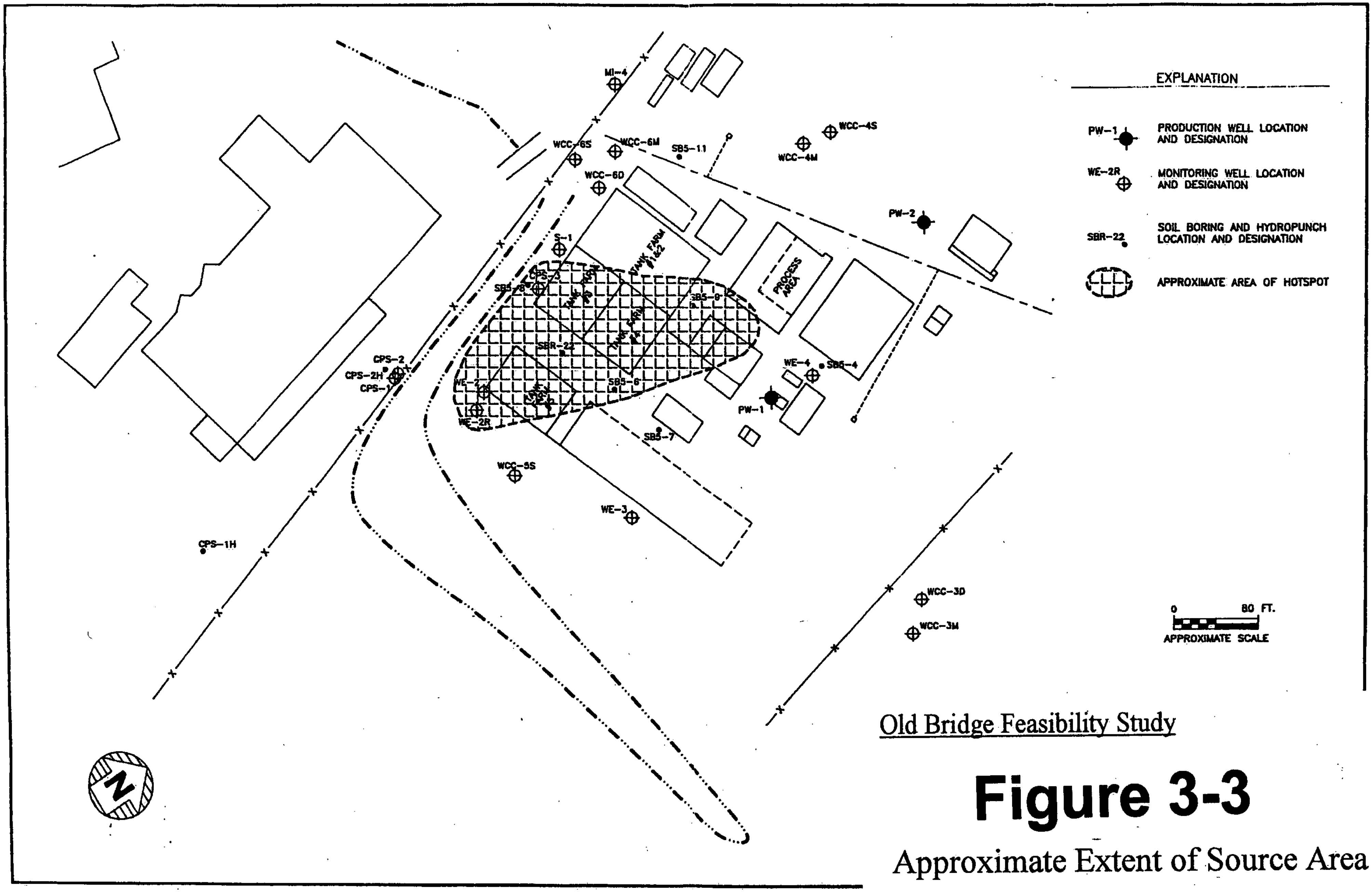


Figure 3-2

On-site Areas of Environmental Concern

907-21



Old Bridge Feasibility Study

Figure 3-3

Approximate Extent of Source Area

MI-8

PARAMETER	CONCENTRATION
1,2-DICHLOROETHANE	2.1
BENZENE	2.1
TRICHLOROETHENE	1.8

RS-2B

PARAMETER	CONCENTRATION
1,1,2,2-TETRACHLOROETHANE	1.0
1,2-DICHLOROETHANE	15
BENZENE	17
CHLOROBENZENE	67
TRICHLOROETHENE	3.6
VINYL CHLORIDE	3.4

RS-2C

PARAMETER	CONCENTRATION
1,1,2,2-TETRACHLOROETHANE	<MCL
1,2-DICHLOROETHANE	<MCL
BENZENE	<MCL
CHLOROBENZENE	<MCL
TRICHLOROETHENE	<MCL
VINYL CHLORIDE	<MCL

CPS-3

PARAMETER	CONCENTRATION
1,1,2,2-TETRACHLOROETHANE	2.6
1,2-DICHLOROETHANE	66
BENZENE	16
CHLOROBENZENE	150
TETRACHLOROETHENE	2U
TRICHLOROETHENE	9.3

WCC-1M

PARAMETER	CONCENTRATION
1,1,2,2-TETRACHLOROETHANE	1.2
1,2-DICHLOROETHANE	50
TRICHLOROETHENE	8

PA-B

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

DEP-2

PARAMETER	CONCENTRATION
1,2-DICHLOROETHANE	2
1,2-DICHLOROETHANE	2

WCC-16VS

PARAMETER	CONCENTRATION
1,2-DICHLOROETHENE	12

DW-1S

PARAMETER	CONCENTRATION
NOT SAMPLED	

DW-1D

PARAMETER	CONCENTRATION
NOT SAMPLED	

RW-2

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

WE-2R

PARAMETER	CONCENTRATION
NOT SAMPLED	8.4

WCC-3M

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

CPS-1

PARAMETER	CONCENTRATION
1,1,2,2-TETRACHLOROETHANE	25U
1,1-DICHLOROETHENE	25U
1,2-DICHLOROETHANE	25U
1,4-DICHLOROBENZENE	110
BENZENE	220
CHLOROBENZENE	2800
TRICHLOROETHENE	25U
VINYL CHLORIDE	25U

WCC-12

PARAMETER	CONCENTRATION
NOT SAMPLED	

DW-13D

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

MI-7

PARAMETER	CONCENTRATION
1,1,2,2-TETRACHLOROETHANE	3.5

DW-5S

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

DW-5D

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

DW-14

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

DW-10D

PARAMETER	CONCENTRATION
NOT SAMPLED	

EPA-5

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

DW-9D

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

EPA-1

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

DW-9S

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

EPA-2

PARAMETER	CONCENTRATION
ALL VOCs	NO EXCEEDANCE OF MCLs

NOTES:

PARAMETER	MCL CONCENTRATION – UG/L
METHYLENE CHLORIDE	3
VINYL CHLORIDE	2
1,1-DICHLOROETHENE	2
1,1-DICHLOROETHANE	50
1,2-DICHLOROETHENE (TOTAL)	(70–100)
1,2-DICHLOROETHANE	2
TRICHLOROETHENE	1
BENZENE	1
1,1,2-TRICHLOROETHANE	3
TETRACHLOROETHENE	1
1,1,2,2-TETRACHLOROETHANE	1
CHLOROBENZENE	50
1,2-DICHLOROBENZENE	600
1,4-DICHLOROBENZENE	75

MCL = MAXIMUM CONTAMINANT LEVEL

CONCENTRATIONS ARE IN UG/L

SES Strategic Environmental Solutions

PLUME OF VOLATILE ORGANICS
BASED ON EXCEEDANCE OF MCLs
DECEMBER 2004

CIBA SPECIALITY CHEMICALS CORPORATION
MIDDLESEX COUNTY, OLD BRIDGE, NEW JERSEY

PREPARED BY: GLP/RHS | DATE: MARCH 2005

JOB NO.:

Figure 3-4

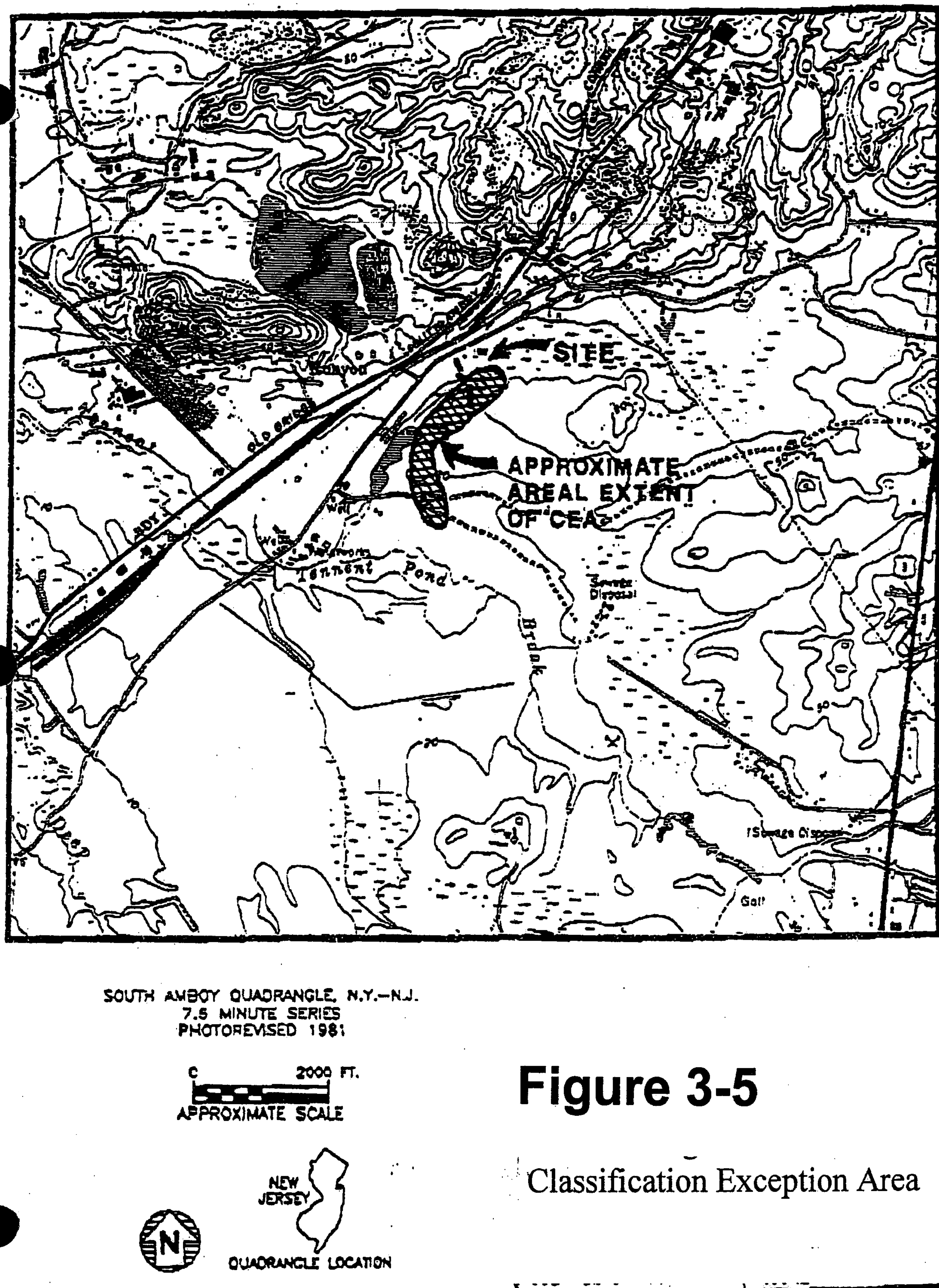


Figure 3-5

Classification Exception Area

TABLES

Table 3-1

Summary of Soil Sampling Results
CPS, Inc. - Old Bridge, New Jersey

Analytical Parameter	Frequency of Detection [1]	Range of Detected Concentrations (ppm)[1]	NJDEP RDCSCC (ppm) [2]	NJDEP IGWSCC (ppm) [2]	USEPA SSL (ppm) [2]
VOCs					
Acetone	87/113	0.002 - 45	1,000	100	7,800
Benzene	4/113	0.004 - 0.094	3	1	22
2-Butanone	1/113	0.006	1,000	50	N/A
Carbon Disulfide	1/67	0.006	–	–	7,800
Chlorobenzene	24/113	0.004 - 6.60 [(3)]	37	1(10*)	1,600
1,2-Dichloroethylene (total)	3/101	0.005 - 0.015	t - 1,000 c - 79	t - 50 c - 1	t - 1,600 c - 780
Ethylbenzene	17/113	0.003 - 11	1,000	100	7,800
Methylene Chloride	2/113	0.002 - 0.005	49	1	85
4-Methyl-2-pentanone	2/71	0.080 - 0.160	1,000	50	N/A
1,1,2,2-Tetrachloroethane	1/113	0.010	34	1	3
Tetrachloroethylene	14/113	0.002 - 0.016	4	1	12
Toluene	61/113	0.003 - 220	1,000	500	16,000
Xylenes	32/113	0.002 - 65	410	75*	1.6E +05
BNs					
acenaphthene	1/20	0.089	3,400	100	4,700
Benzo (a) anthracene	1/20	0.055	0.9	500	0.9
Bis (2-ethylhexyl) phthalate	11/20	0.083 - 5.60	49	100	46
Butylbenzyl phthalate	1/20	0.180	1,100	100	16,000
Chrysene	1/20	0.074	9	500	88
1,2-Dichlorobenzene	9/113 [(6)]	0.004 - 22	5,100	50	7,000
1,3-Dichlorobenzene	10/113 [(6)]	0.004 - 1	5,100	100	N/A
1,4-Dichlorobenzene	21/113 [(6)]	0.004 - 6.2	570	100	27
Di-n-Butyl Phthalate	1/20	0.220	5,700	100	N/A
Di-n-Octyl Phthalate	5/20	0.056 - 0.270	1,100	100	1,600
Fluoranthene	1/20	0.150	2,300	100	3,100
Phenanthrene	2/20	0.051 - 0.078	–	–	N/A
Pyrene	1/20	0.110	1,700	100	2,300
1,2,4-Trichlorobenzene	4/20	0.320 - 11	68	100	780
Metals					
Antimony	4/27	0.500 - 1.60	14	–	31
Arsenic	23/27	0.680 - 10	20	–	0.4
Cadmium	4/27	0.740 - 2.9	1 [39 [(4)]]	1 [39 [(4)]]	78
Chromium (III)	28/27	5.30 - 49	500	–	78,000
Copper	27/27	2.40 - 210	600	–	N/A
Lead	11/27	3.20 - 130	400	–	400
Mercury	2/27	0.100 - 0.140	14	–	N/A
Nickel	12/27	4.20 - 57	250	–	1,600
Silver	4/27	1.10 - 3.10	110	–	390
Zinc	28/27	6.60 - 1,600 [(5)]	1,500	–	23,000

Footnote:

(1) Appendix A - RI soils data

(2) NJDEP Proposed rule entitled Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D
USEPA Soil Screening Guidance, Appendix A, 1994.

(3) five sample exceedences of IGWSCC for Chlorobenzene.

(4) approved site-specific alternate cleanup standard (ACS) (see Section 2.2.1).

(5) one sample exceedence of RDCSCC for Zinc.

(6) contaminants of concern were analyzed at greater frequency than other BNs.

* = Interim default IGWSCC calculated from new GWQS Interim Specific Criteria (NJDEP, 1997).

DRAI Job No. 91C907
D4883/RPT-TAB/SOILRES.WK4

Table 3-2

Summary of Plume Groundwater Quality Versus Time

Well Number	1993	1994	1995	1996	1997	1998	1999	Dec. 1998	Mar. 1999	June 1999	Sep. 1999	Dec. 1999
	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)	(µg/L)
CPS-3	NA	NA	2,389	9,646	5,863	4,840	4,166	5,312	4,201	4,466	3,109	4,886
WE-02R	NA	59,010	41,758	13,416	5,024	2,957	1,857	2,271	1,461	1,916	2,327	1,724
CPS-1	NA	NA	12,253	4,526	4,674	2,789	241	230	375	148	247	193
PA-B	110	120	532	138	249	164	26	380	33	34	13*	25
DEP-2	182	126	84	86	48	80	46	37	82	12	82	6*
DW-5S	1,013	19	32	8	7	2	8	5*	13*	6*	0.9*	13
DW-5D	15	ND	20	9	9	0.3	0.3	ND*	ND*	0.7*	3*	0.2*
WCC-16VS	16	331	24	83	302	76	133	98	138	78	87	229
RW-2	556	283	524	268	65	30	22	29*	26*	22*	17*	NA
EPA-5	321	202	58	45	34	53	18	52	10*	27	28	6*
DW-13D	3	2	3	6	68	13	4	8*	7*a	2*	2*	7*
DW-14	7	4	5	6	7	6	5	2*	2*	7*	8	3*
EPA-1	12	6	3	17	23	5	17	3*	12*	6.5*	19*	32
DW-9D	0.2	ND	ND	0.4	0.7	5	0.3	ND*a	ND*	0.6*	0.5*	ND*
DW-9S	3	0.2	0.2	1	0.5	0.8	0.2	ND*	ND*	0.8*	2*	ND*
EPA-2	21	8	5	2.5	1	1	2	ND*	ND*	2*	5*	0.7*

*= No exceedances of NJ GWQS (applies to last five columns only)
NA = Not analyzed
ND = Not detected

Note: The first seven columns of data are concentration averages of the quarterly sampling rounds that occurred in each year. The last five columns contain data for each of the most recent three reported quarterly sampling events.

Note: Acetone omitted from totals. Not included (analyzed) in early data. Also frequently found in blanks.

Table 3-3
Recent Surface Water Sampling

Compound	SW-01	SW-02	SW-03	TB-02
Acetone	3.3 B	11 B	3.7 B	24
Chloromethane		0.4		
Bromomethane				
Vinyl Chloride				
Chloroethane				
Methylene Chloride				
Trichlorofluoromethane				
Acrolein				
Acrylonitrile				
1,1-Dichloroethene				
1,1-Dichloroethane				
1,2-Dichloroethene (total)				
Chloroform	0.3			
1,2-Dichloroethane				
1,1,1-Trichloroethane				
Carbon Tetrachloride				
Bromodichloromethane				
2-Chloroethyl vinyl ether				
1,2-Dichloropropane				
cis-1,3-Dichloropropene				
Trichloroethene				
Benzene				
trans-1,3-Dichloropropene				
Dibromochloromethane				
1,1,2-Trichloroethane				
Bromoform				
Tetrachloroethene				
1,1,2,2-Tetrachloroethane				
Toluene				
Chlorobenzene				
Ethylbenzene				
1,2-Dichlorobenzene				
1,3-Dichlorobenzene				
1,4-Dichlorobenzene				
Total Xylenes				

J - Estimated concentrations of analyte which is present but at a concentration less than the stated detection limit.
B - Analyte found in blanks as well as samples.
E - Indicates that it exceeds calibration curve range.
ND - Not detected

Note:
SW-01-Tail of Pricketts Brook
SW-02-Pricketts Brook at CPS/Madison Fenceline

Table 3-4
Summary of Sediment Sampling

Sampling Depth (inches)	Frequency of Detection	Range of Detected Concentrations (ppm)
Pond Sediments		
0 - 6	15/15	0.012 - 2.74
12 - 18	13/15	0.010 - 0.396
24 - 30	14/14	0.010 - 0.205
36 - 42	12/12	0.020 - 0.448
48 - 54	2/2	0.065 - 0.077
60 - 66	4/4	0.010 - 1.43
Downgradient Stream Sediments		
0 - 6	4/4	0.147 - 1.68
12 - 18	4/4	0.032 - 1.74
24 - 30	3/3	0.163 - 1.94
36 - 42	3/3	0.112 - 1.67
48 - 54	1/1	0.683
60 - 66	1/1	0.085
Upgradient Stream Sediments		
0 - 6	2/2	0.020
12 - 18	2/2	0.010 - 0.011
24 - 30	2/2	0.020
36 - 42	1/1	0.020
48 - 54	0/0	--
60 - 66	0/0	--

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D3-3848/SEDRES.WK4

Table 4-1

Summary of Soil Sampling Results
CPS, Inc. - Old Bridge, New Jersey

Analytical Parameter	Frequency of Detection [1]	Range of Detected Concentrations (ppm)[1]	NJDEP RDCSCC (ppm) [2]	NJDEP IGWSCC (ppm) [2]	USEPA SSL (ppm) [2]
VOCs					
Acetone	87/113	0.002 - 45	1,000	100	7,800
Benzene	4/113	0.004 - 0.094	3	1	22
2-Butanone	1/113	0.006	1,000	50	N/A
Carbon Disulfide	1/67	0.006	--	--	7,800
Chlorobenzene	24/113	0.004 - 6.60 (3)	37	1(10*)	1,600
1,2-Dichloroethylene (total)	3/101	0.005 - 0.015	t - 1,000 c - 79	t - 50 c - 1	t - 1,600 c - 780
Ethylbenzene	17/113	0.003 - 11	1,000	100	7,800
Methylene Chloride	2/113	0.002 - 0.005	49	1	85
4-Methyl-2-pentanone	2/71	0.080 - 0.160	1,000	50	N/A
1,1,2,2-Tetrachloroethane	1/113	0.010	34	1	3
Tetrachloroethylene	14/113	0.002 - 0.016	4	1	12
Toluene	61/113	0.003 - 220	1,000	500	16,000
Xylenes	32/113	0.002 - 65	410	75*	1.6E +05
BNs					
acenaphthene	1/20	0.089	3,400	100	4,700
Benzo (a) anthracene	1/20	0.055	0.9	500	0.9
Bis (2-ethylhexyl) phthalate	11/20	0.083 - 5.60	49	100	46
Butylbenzyl phthalate	1/20	0.180	1,100	100	16,000
Chrysene	1/20	0.074	9	500	88
1,2-Dichlorobenzene	9/113 (6)	0.004 - 22	5,100	50	7,000
1,3-Dichlorobenzene	10/113 (6)	0.004 - 1	5,100	100	N/A
1,4-Dichlorobenzene	21/113 (6)	0.004 - 6.2	570	100	27
Di-n-Butyl Phthalate	1/20	0.220	5,700	100	N/A
Di-n-Octyl Phthalate	5/20	0.056 - 0.270	1,100	100	1,600
Fluoranthene	1/20	0.150	2,300	100	3,100
Phenanthrene	2/20	0.051 - 0.078	--	--	N/A
Pyrene	1/20	0.110	1,700	100	2,300
1,2,4-Trichlorobenzene	4/20	0.320 - 11	68	100	780
Metals					
Antimony	4/27	0.500 - 1.60	14	--	31
Arsenic	23/27	0.680 - 10	20	--	0.4
Cadmium	4/27	0.740 - 2.9	1 [39 (4)]	1 [39 (4)]	78
Chromium (III)	28/27	5.30 - 49	500	--	78,000
Copper	27/27	2.40 - 210	600	--	N/A
Lead	11/27	3.20 - 130	400	--	400
Mercury	2/27	0.100 - 0.140	14	--	N/A
Nickel	12/27	4.20 - 57	250	--	1,600
Silver	4/27	1.10 - 3.10	110	--	390
Zinc	28/27	6.60 - 1,600 (5)	1,500	--	23,000

Footnote:

(1) Appendix A - RI soils data

(2) NJDEP Proposed rule entitled Cleanup Standards for Contaminated Sites, N.J.A.C. 7:26D
USEPA Soil Screening Guidance, Appendix A, 1994.

(3) five sample exceedences of IGWSCC for Chlorobenzene.

(4) approved site-specific alternate cleanup standard (ACS) (see Section 2.2.1).

(5) one sample exceedence of RDCSCC for Zinc.

(6) contaminants of concern were analyzed at greater frequency than other BNs.

* = Interim default IGWSCC calculated from new GWQS Interim Specific Criteria (NJDEP, 1997).

DRAI Job No. 91C907
D4883/RPT-TAB/SOILRES.WK4

Table 4-2

Summary of Background Soil Sampling Results
CPS, Inc. - Old Bridge, New Jersey

Analytical Parameter	Frequency of Detection (1)	Range of Detected Concentrations (ppm) (2)	NJ Statewide Range of Average Suburban Background (ppm) (3)	Middlesex County Range of Average Suburban Background (ppm) (3)	Middlesex County Suburban Background Sample (ppm) (3)
VOCs					
Acetone	3/3	1.8 - 2.9	--	--	--
Tetrachloroethylene	1/3	0.019	--	--	--
Toluene	2/3	0.002 - 0.059	--	--	--
BNs					
Anthracene	1/1	0.045	--	--	--
Benzo (a) anthracene	1/1	0.070	--	--	--
Chrysene	1/1	0.090	--	--	--
1,2-Dichlorobenzene	1/1	0.080	--	--	--
Fluoranthene	1/1	0.250	--	--	--
Isophorone	1/1	0.091	--	--	--
Naphthalene	1/1	0.220	--	--	--
Phenanthrene	1/1	0.380	--	--	--
Pyrene	1/1	0.210	--	--	--
Metals					
Arsenic	1/1	3.1	0.02 - 22.70	1.7 - 8.4	8.4
Chromium (III)	1/1	9.3	2.2 - 21.4	5.4 - 25.6	14.3
Copper	1/1	16	0.8 - 41.7	4.4 - 41.7	41.7
Lead	1/1	20	<1.2 - 150	15.3 - 65.7	58.9
Nickel	1/1	6.5	<1.2 - 19.2	2.2 - 28.7	8.5
Zinc	1/1	74	2.1 - 121	19.1 - 88.9	40.6

Notes: (1) Appendix A - RI soils data - SBBG samples only
(2) Appendix A - RI soils data - SBBG samples only
(3) Fields, et al., 1993

DRAI Job No. 91C907

D4883/RPT-TABMETRES.WK4

Table 4-3

Summary of Ground Water Sampling Results for Monitoring Wells CPS-1, CPS-2, CPS-3, WCC-6S and WE-2R
CPS, Inc. - Old Bridge, New Jersey

Analytical Parameter	Frequency of Detection (1)	Range of Detected Concentrations (ppm) (1)	NJDEP GWQS (ppb) (2)	USEPA MCL (ppb) (3)
VOCs				
Acetone	2/8	4.4 - 94	700	NA
Benzene	5/8	370 - 1,400	1	5
Chlorobenzene	5/8	1,800 - 13,000	50*	100
Chloroform	1/8	1.7	6	NA
1,2-Dichlorobenzene	5/8	1,200 - 6,000	600	600
1,3-Dichlorobenzene	3/8	290 - 1,100	600	NA
1,4-Dichlorobenzene	5/8	100 - 3,800	75	75
1,2-Dichloroethane	6/8	82 - 3,100	2	5
trans-1,2-Dichloroethylene	4/8	27 - 3,300	100	100
Ethylbenzene	6/8	340 - 1,900	700	700
Methylene Chloride	4/8	3,500 - 21,000	3*	5
1,1,2,2-Tetrachloroethane	1/8	450	2	NA
Tetrachloroethylene	1/8	1.3	1	5
Toluene	4/8	2,500 - 11,000	1,000	1,000
1,1,2-Trichloroethane	1/8	170	3	5
Trichloroethylene	5/8	21 - 150	1	5
Vinyl Chloride	1/8	190	5	2
Xylenes (total)	5/8	800 - 9,300	1,000*	10,000
PP-Metals (total + dissolved phase)				
Aluminum	8/10	360 - 160,000	200	50 - 200 **
Antimony	6/12	6.8 - 11	20	6
Arsenic	9/12	7 - 77	8	50
Beryllium	1/12	8.6	20	4
Cadmium	4/12	4.3 - 27	4	5
Chromium (III)	4/12	11 - 1,400	100	100
Copper	5/12	29 - 38,000	1,000	1,300 (AL)
Iron	10/10	11,000 - 220,000	300	300 **
Lead	7/12	3.7 - 830	10	15 (AL)
Maganese	10/10	160 - 560	50	50 **
Nickel	5/12	42 - 200	100	100
Sodium	10/10	5,800 - 76,000	50,000	--
Thallium	2/12	11 - 21	10	2
Zinc	10/12	21 - 12,000	5,000	5,000 **

Notes: (1) All data derived from Appendix A Ground Water sampling results

(2) N.J.A.C. 7:9-6

(3) 40 CFR Part 141.

MCL = Maximum contaminant level.

GWQS = Ground Water Quality Standard reflecting higher of Practical Quantitation Level or GWQS.

* = Interim Specific Criteria (NJDEP, 1997).

** = Secondary MCL.

(AL) Action Level = concentration of Pb or Cr in water which determines treatment requirements for public water supply systems.

DRAI Job No. 91C907

D4883/RPT-TAB/GWRES.WK4

Table 4-4

Summary of Total Volatile Organic Compounds in Sediment
CPS, Inc. - Old Bridge, New Jersey

Sampling Depth (inches)	Frequency of Detection (1)	Range of Detected VOC Concentrations (ppm) (1)
Pond Sediments		
0 - 6	15/15	0.012 - 2.74
12 - 18	13/15	0.010 - 0.396
24 - 30	14/14	0.010 - 0.205
36 - 42	12/12	0.020 - 0.448
48 - 54	2/2	0.065 - 0.077
60 - 66	4/4	0.010 - 1.43
Downgradient Stream Sediments		
0 - 6	4/4	0.147 - 1.68
12 - 18	4/4	0.032 - 1.74
24 - 30	3/3	0.163 - 1.94
36 - 42	3/3	0.112 - 1.67
48 - 54	1/1	0.683
60 - 66	1/1	0.085
Upgradient Stream Sediments		
0 - 6	2/2	0.020
12 - 18	2/2	0.010 - 0.011
24 - 30	2/2	0.020
36 - 42	1/1	0.020
48 - 54	0/0	--
60 - 66	0/0	--

Notes: (1) Individual VOC concentration results available in Wehran, 1984, see Section 7.0 - References.

DRAI Job No. 91C907
D4883/RPT-TAB/SEDRES.WK4

Table 4-5

Potential Contaminants of Concern
CPS, Inc. - Old Bridge, New Jersey

Contaminant	Concentration Range Soil (ppm) (1)	Ground Water (ppb) (2)
VOCs		
Benzene	—	370 - 1,400
Chlorobenzene	—	1,800 - 13,000
1,2-Dichlorobenzene	—	1,200 - 6,000
1,3-Dichlorobenzene	—	290 - 1,100
1,4-Dichlorobenzene	—	100 - 3,800
1,2-Dichloroethane	—	82 - 3,100
t-1,2-Dichloroethylene	—	27 - 3,300
Ethylbenzene	—	340 - 1,900
Methylene Chloride	—	3,500 - 21,000
1,1,2,2-Tetrachloroethane	—	450
Tetrachloroethylene	—	1.3
Toluene	—	2,500 - 11,000
1,1,2-Trichloroethane	—	170
Trichloroethylene	—	21 - 150
Vinyl Chloride	—	190
Xylenes (total)	—	800 - 9,300
Metals		
Antimony	—	6.8 - 11
Arsenic	0.68 - 10	7 - 77
Beryllium	—	8.6
Cadmium	—	4.3 - 27
Chromium (III)	—	11 - 1,400
Copper	—	29 - 38,000
Lead *	—	3.7 - 830
Thallium	—	11 - 21
Zinc	—	21 - 12,000

Notes: * qualitative only, due to limited toxicity data.
(1) Appendix A - Soils RI data, DRAI, 1996
(2) Appendix A - Ground Water RI data, DRAI, 1996

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Table 4-6

Summary of Exposure Concentrations
CPS, Inc. - Old Bridge, New Jersey

Population/Pathways	Exposure Concentration (ppb)	Comments
Current Use - Residential		
Ingestion of On-Site Ground Water (ppb) :		
Benzene	1,400	
Chlorobenzene	13,000	Values are maximum concentrations detected from on-site and off-site monitoring wells located within the contaminant plume. (See Table 2.III for monitoring well results.)
1,2-Dichlorobenzene	6,000	
1,3-Dichlorobenzene	1,100	
1,4-Dichlorobenzene	3,800	
1,2-Dichloroethane	3,100	
t-1,2-Dichloroethylene	3,300	
Ethylbenzene	1,900	
Methylene Chloride	21,000	
1,1,2,2-Tetrachloroethane	450	
Tetrachloroethylene	1.3	
Toluene	11,000	
1,1,2-Trichloroethane	170	
Trichloroethylene	150	
Vinyl Chloride	190	
Xylenes (total)	9,300	
Antimony	11	
Arsenic	77	
Beryllium	8.6	
Cadmium	27	
Chromium (III)	1,400	
Copper	38,000	
Lead *	830	
Thallium	21	
Zinc	12,000	
Current Use - Residential **Inhalation of Vapor Phase Contaminants from On-Site Ground Water (mg/m^3):**	**Exposure Concentration (mg/m^3)**	
Benzene	9.9	
Chlorobenzene	92	Concentrations are modeled values of vapor phase contaminants in bathroom air (Schuam et. al., 1992) based on maximum concentrations of contaminants in ground water. (See Appendix C, Spreadsheet VIII)
1,2-Dichlorobenzene	43	
1,3-Dichlorobenzene	7.8	
1,4-Dichlorobenzene	27	
1,2-Dichloroethane	22	
t-1,2-Dichloroethylene	23	
Ethylbenzene	13	
Methylene Chloride	150	
1,1,2,2-Tetrachloroethane	3.2	
Tetrachloroethylene	0.009	
Toluene	78	
1,1,2-Trichloroethane	1.2	
Trichloroethylene	1.1	
Vinyl Chloride	1.3	
Xylenes (total)	66	
Current Use - Industrial **<u>Site Worker</u>**		Concentration is the 95 percent UCL on the arithmetic mean of the transformed (lognormal) measured concentrations in on-site surface and subsurface soils. (See Table 3.IV for sampling results.)
Ingestion of Soil (ppm):		
Arsenic	3.1	
Future Use - Construction **<u>Construction Worker</u>**		Concentration is the 95 percent UCL on the arithmetic mean of the transformed (lognormal) measured concentrations in on-site surface and subsurface soils. (See Table 3.IV for sampling results.)
Ingestion of Soil (ppm):	3.1	
Arsenic		

Notes: * qualitative only, due to limited toxicity data.

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Table 4-7

Results of Exposure Assessment
CPS, Inc. - Old Bridge, New Jersey

Exposure Pathway	Chemical	Weight-of-Evidence Class *	Chronic Daily Intake (mg/kg-d) Carcinogenic Effects Adult (1)	Carcinogenic Effects Child (2)	Carcinogenic Effects Total (3)	NonCarcinogenic Effects Adult (4)	NonCarcinogenic Effects Child (5)
Ingestion of ground water through current residential potable use	benzene	A	1.3E-02	7.7E-03	2.1E-02	3.8E-02	8.9E-02
	chlorobenzene	D	–	–	–	3.6E-01	8.3E-01
	1,2-dichlorobenzene	D	–	–	–	1.6E-01	3.8E-01
	1,3-dichlorobenzene	D	–	–	–	3.0E-02	7.0E-02
	1,4-dichlorobenzene	C	3.6E-02	2.1E-02	5.7E-02	1.0E-01	2.4E-01
	1,2-dichloroethane	B2	2.9E-02	1.7E-02	4.6E-02	8.5E-02	2.0E-01
	t-1,2-dichloroethylene	--	–	–	–	9.0E-02	2.1E-01
	ethylbenzene	D	–	–	–	5.2E-02	1.2E-01
	methylene chloride	B2	2.0E-01	1.2E-01	3.2E-01	5.8E-01	1.3E+00
	1,1,2,2-tetrachloroethane	C	4.2E-03	2.5E-03	6.7E-03	1.2E-02	2.9E-02
	tetrachloroethylene	B2	1.2E-05	7.1E-06	1.9E-05	3.6E-05	8.3E-05
	toluene	D	–	–	–	3.0E-01	7.0E-01
	1,1,2-trichloroethane	C	1.6E-03	9.3E-04	2.5E-03	4.7E-03	1.1E-02
	trichloroethylene	B2	1.4E-03	8.2E-04	2.2E-03	4.1E-03	9.6E-03
	vinyl chloride	A	1.8E-03	1.0E-03	2.8E-03	5.2E-03	1.2E-02
	xylenes (total)	D	–	–	–	2.5E-01	5.9E-01
	antimony	--	–	–	–	3.0E-04	7.0E-04
	arsenic	A	7.2E-04	4.2E-04	1.1E-03	2.1E-03	4.9E-03
	beryllium	B1	8.1E-05	4.7E-05	1.3E-04	2.4E-04	5.5E-04
	cadmium	B1	2.5E-04	1.5E-04	4.0E-04	7.4E-04	1.7E-03
	chromium (III)	--	–	–	–	3.8E-02	8.9E-02
	copper	D	–	–	–	1.0E+00	2.4E+00
	lead	B2	7.8E-03	4.5E-03	1.2E-02	2.3E-02	5.3E-02
	thallium	--	–	–	–	5.8E-04	1.3E-03
	zinc	D	–	–	–	3.3E-01	7.7E-01
					–		
Inhalation of vapor phase chemicals which have volatilized during current residential potable ground water use (showering)	benzene	A	1.9E-02	NR	1.9E-02	4.3E-02	NR
	chlorobenzene	D	–	NR	–	4.0E-01	NR
	1,2-dichlorobenzene	D	–	NR	–	1.9E-01	NR
	1,3-dichlorobenzene	D	–	NR	–	3.4E-02	NR
	1,4-dichlorobenzene	C	5.0E-02	NR	5.0E-02	1.2E-01	NR
	1,2-dichlorobenzene	B2	4.1E-02	NR	4.1E-02	9.6E-02	NR
	t-1,2-dichloroethylene	–	–	NR	–	1.0E-01	NR
	ethylbenzene	D	–	NR	–	5.7E-02	NR
	methylene chloride	B2	2.8E-01	NR	2.8E-01	6.5E-01	NR
	1,1,2,2-tetrachloroethane	C	6.0E-03	NR	6.0E-03	1.4E-02	NR
	tetrachloroethylene	B2	1.7E-05	NR	1.7E-05	4.0E-05	NR
	toluene	D	–	NR	–	3.4E-01	NR
	1,1,2-trichloroethane	C	2.3E-03	NR	2.3E-03	5.2E-03	NR
	trichloroethylene	B2	2.0E-03	NR	2.0E-03	4.8E-03	NR
	vinyl chloride	A	2.4E-03	NR	2.4E-03	5.7E-03	NR
	xylenes (total)	D	–	NR	–	2.9E-01	NR
Ingestion of soil by current industrial site workers	arsenic	A	5.4E-07 (6)	NR	5.4E-07 (6)	1.5E-06 (6)	NR
Ingestion of soil by future construction workers	arsenic	A	5.4E-08 (6)	NR	5.4E-08 (6)	3.8E-06 (6)	NR

Notes: (1) Based on an exposure duration of 24 years; Appendix C; Spreadsheet III (ingestion) and Spreadsheet I (inhalation).
(2) Based on an exposure duration of 6 years; Appendix C, Spreadsheet III.
(3) Based on a total exposure duration of 30 years = adult + child.
(4) Based on an exposure duration of 30 years; Appendix C, Spreadsheet V (ingestion) and Spreadsheet II (inhalation).
(5) Based on an exposure duration of 6 years; Appendix C, Spreadsheet VI.
(6) See Section 3.4, "Site Workers and Future Construction Worker Exposure Scenarios" for calculations.
NR = Not relevant.

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* Weight of evidence for human carcinogenicity:
Group A = human carcinogen
Group B = probable human carcinogen
B1 = limited evidence from epidemiologic studies
B2 = "sufficient" evidence for animal studies and "inadequate" evidence or "no data" from epidemiologic studies
Group C = possible human carcinogen
Group D = no classification as to human carcinogenicity

Table 4-8

Inhalation Toxicity Values - Potential Noncarcinogenic Effects
CPS, Inc. - Old Bridge, New Jersey

Chemical	Reference Concentration (RfC) (mg/m³)	Reference Concentration (RfC) (mg/kg-d)	Confidence Level	RfC Source	Critical Effects	Uncertainty and Modifying Factors
benzene	6E-03	2E-03	medium	ECAO	hematopoietic progenitor cell alterations	UF=1,000 MF=1
chlorobenzene	2E-02	5E-03	low	HEAST	liver and kidney effects	UF=10,000 MF=1
1,2-dichlorobenzene	2E-01	9E-03	low	HEAST	whole body decreased weight gain	UF=1,000 MF=1
1,3-dichlorobenzene	8E-03	2E-03	low	ECAO	liver toxicity	UF=1,000 MF=3
1,4-dichlorobenzene	8E-01	2E-01	medium	IRIS	increased liver weights	UF=100 MF=1
1,2-dichloroethane	5E-03	1E-03	low	ECAO	GI tract, liver, kidney and mucous membrane toxicity	UF=3,000 MF=1
t-1,2-dichloroethylene	NA	NA	NA	NA	NA	NA
ethylbenzene	1E+00	3E-01	low	IRIS	liver and kidney toxicity	UF=300 MF=1
methylene chloride	3E+00	9E-01	medium	HEAST	liver toxicity	UF=100 MF=1
1,1,2,2-tetrachloroethane	NA	NA	NA	NA	NA	NA
tetrachloroethylene	NA	1.4E-01	NA	NA	NA	NA
toluene	4E-01	1E-01	medium	IRIS	Neurological	UF=300 MF=1
1,1,2-trichloroethane	NA	NA	NA	NA	NA	NA
trichloroethylene	NA	NA	NA	NA	NA	NA
vinyl chloride	NA	NA	NA	NA	NA	NA
xylenes (total)	NA	NA	NA	NA	NA	NA

NA = not available.
IRIS = Integrated Risk Information System, 1997.
HEAST = Health Effects Assessment Summary Tables, 1995.
ECAO = Environmental Criteria Assessment Office, Superfund Health Risk Technical Support Center.

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Table 4-9

Oral Toxicity Values - Potential Noncarcinogenic Effects
CPS, Inc. - Old Bridge, New Jersey

Chemical	Chronic Reference Dose (RfD) (mg/kg-d)	Confidence Level	Critical Effects	RfD Basis	RfD Source	Uncertainty and Modifying Factors
benzene	3E-003	medium	hematological, immunological	water	ECAO	UF = 3,000 MF = 1
chlorobenzene	2E-002	NA	Histopathic changes in liver	gavage	IRIS	UF = 1,000 MF = 1
1,2-dichlorobenzene	9E-002	low	Liver toxicity	gavage	IRIS	UF = 1,000 MF = 1
1,3-dichlorobenzene	3E-002	low	Liver toxicity	Analogous to 1,2-dichlorobenzene	ECAO	UF = 1,000 MF = 3
1,4-dichlorobenzene	3E-002	NA	NA	NA	USEPA/NCEA	NA
1,2-dichloroethane	3E-002	low	organ weight increase	gavage	ECAO	UF = 1,000 MF = 1
t-1,2-dichloroethylene	2E-002	low	Increased serum alkaline phosphatase	water	IRIS	UF = 1,000 MF = 1
ethylbenzene	1E-001	low	liver and kidney toxicity	gavage	IRIS	UF = 1,000 MF = 1
methylene chloride	6E-002	medium	liver toxicity	water	IRIS	UF = 100 MF = 1
1,1,2,2-tetrachloroethane	NA	NA	NA	NA	NA	NA
tetrachloroethylene	1E-002	medium	liver toxicity	gavage	IRIS	UF = 1,000 MF = 1
toluene	2E-001	medium	changes in liver and kidney weights	gavage	IRIS	UF = 1,000 MF = 1
1,1,2-trichloroethane	4E-003	medium	clinical serum chemistry effects	water	IRIS	UF = 1,000 MF = 1
trichloroethylene	6E-003	low	liver and kidney toxicity	water	ECAO	UF = 3,000 MF = 1
vinyl chloride	NA	NA	NA	NA	NA	NA
xylenes (total)	2E+000	medium	hyperactivity, decreased body weight and increased mortality	gavage	IRIS	UF = 100 MF = 1
antimony	4E-004	low	longevity, blood glucose and cholesterol	water	IRIS	UF = 1,000 MF = 1
arsenic	3E-004	medium	hyperpigmentation, keratosis and possible vascular complications	water	IRIS	UF = 3 MF = 1
beryllium	2E-003	low	intestinal lesions	water	IRIS	UF = 300 MF = 1
cadmium	5E-004	high	significant proteinuria	water	IRIS	UF = 10 MF = 1
chromium (III)	1E+000	low	No adverse effects observed	gavage	IRIS	UF = 100 MF = 10
copper	4E-002	NA	NA	NA	ECAO	NA
lead	NA	NA	NA	NA	NA	NA
thallium sulfate (soluble salt)	8E-005	low	altered blood chemistry	gavage	IRIS	UF = 3,000 MF = 1
zinc	3E-001	medium	decrease in erythrocyte superoxide dismutase	diet supplements	IRIS	UF = 3 MF = 1

IRIS = Integrated Risk Information System, 1998.
HEAST = Health Effects Assessment Summary Tables, 1995.
ECAO = Environmental Criteria Assessment Office, Superfund Health Risk Technical Support Center.
NCEA = National Center for Environmental Assessment.
NA = Not available.

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Table 4-10

Toxicity Values - Potential Carcinogenic Effects
CPS, Inc. - Old Bridge, New Jersey

Chemical	Slope Factor (SF) 1/(mg/kg-d)	Weight-of-Evidence Class	Type of Cancer	SF Basis	SF Source
Oral Slope Factors					
benzene	3E-02	A	leukemia	inhalation	IRIS
1,4-dichlorobenzene	2E-02	C	liver tumors	gavage	HEAST
1,2-dichloroethane	9E-02	B2	lung, blood, liver tumors	gavage	IRIS
methylene chloride	8E-03	B2	liver tumors	water	IRIS
1,1,2,2-tetrachloroethane	2E-01	C	liver carcinoma	gavage	IRIS
tetrachloroethylene	5E-02	C-B2	NA	NA	ECAO
1,1,2-trichloroethane	6E-02	C	liver carcinoma	gavage	IRIS
trichloroethylene	1E-02	C-B2	NA	NA	ECAO
vinyl chloride	2E+00	A	lung, liver tumors	gavage	HEAST
arsenic	2E+00	A	organ cancers	water	IRIS
beryllium	NA	B1	lung tumors	water	IRIS
cadmium	NA	B1	NA	NA	NA
Inhalation Slope Factors					
benzene	3E-02	A	leukemia	inhalation	IRIS
1,4-dichlorobenzene	2.2E-02	C	NA	NA	NA
1,2-dichloroethane	9E-02	B2	lung, blood, liver tumors	gavage	IRIS
methylene chloride	2E-03	B2	liver, lung tumors	inhalation	IRIS
1,1,2,2-tetrachloroethane	2E-01	C	liver carcinoma	gavage	IRIS
tetrachloroethylene	2E-03	C-B2	NA	NA	ECAO
1,1,2-trichloroethane	6E-02	C	liver carcinoma	gavage	IRIS
trichloroethylene	6E-03	C-B2	NA	NA	ECAO
vinyl chloride	3E-01	A	liver tumors	inhalation	HEAST

IRIS = Integrated Risk Information System, 1997/1998.
HEAST = Health Effects Assessment Summary Tables, 1995.
ECAO = Environmental Criteria Assessment Office, Superfund Health Risk Technical Support Center.
NA = Not available.
Note: All slope factor values are rounded to the closest integer except for 1,4-dichlorobenzene (inhalation).

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D4883/RPT-TAB/POT-CAR.WK4

Table 4-11

Ground Water Chronic Hazard Index Estimates
Residential - Current Use
CPS, Inc. - Old Bridge, New Jersey

Chemical	Child CDI (CCDI) (1) (mg/kg-d)	Adult CDI (ACDI) (2) (mg/kg-d)	RfD (3) (mg/kg-d)	Confidence Level	Child Hazard Quotient (CHQ) (4)	Adult Hazard Quotient (AHQ) (4)
Ingestion						
benzene	8.9E-02	3.8E-02	3E-03	medium	30	43
chlorobenzene	8.3E-01	3.6E-01	2E-02	NA	42	59
1,2-dichlorobenzene	3.8E-01	1.6E-01	9E-02	low	4	6
1,3-dichlorobenzene	7.0E-02	3.0E-02	3E-02	low	2	3
1,4-dichlorobenzene	2.4E-01	1.0E-01	3E-02	NA	8	12
1,2-dichloroethane	2.0E-01	8.5E-02	3E-02	low	7	9
t-1,2-dichloroethylene	2.1E-01	9.0E-02	2E-02	low	11	15
ethylbenzene	1.2E-01	5.2E-02	1E-01	low	1.2	1.7
methylene chloride	1.3E+00	5.8E-01	6E-02	medium	22	32
1,1,2,2-tetrachloroethane	2.9E-02	1.2E-02	NA	NA	NA	NA
tetrachloroethylene	8.3E-05	3.6E-05	1E-02	medium	0.008	0.012
toluene	7.0E-01	3.0E-01	2E-01	medium	4	5
1,1,2-trichloroethane	1.1E-02	4.7E-03	4E-03	medium	3	4
trichloroethylene	9.6E-03	4.1E-03	6E-03	low	2	2.3
vinyl chloride	1.2E-02	5.2E-03	NA	NA	NA	NA
xylenes (total)	5.9E-01	2.5E-01	2E+00	medium	0.3	0.42
antimony	7.0E-04	3.0E-04	4E-04	low	1.8	2.5
arsenic	4.9E-03	2.1E-03	3E-04	medium	16	23
beryllium	5.5E-04	2.4E-04	2E-03	low	0.3	0.39
cadmium	1.7E-03	7.4E-04	5E-04	high	3	4.9
chromium (III)	8.9E-02	3.8E-02	1E+00	low	0.09	0.13
copper	2.4E+00	1.0E+00	4E-02	NA	61	87
thallium	1.3E-03	5.8E-04	8E-05	low	17	24
zinc	7.7E-01	3.3E-01	3E-01	medium	3	4
Total Hazard Quotient/Pathway Hazard Index					(Rounded) 239	(Rounded) 338
Inhalation			RfC (5) (mg/kg-d)			
benzene	NR	4.4E-02	2E-03	medium	NR	22
chlorobenzene	NR	4.0E-01	5E-03	low	NR	80
1,2-dichlorobenzene	NR	1.9E-01	9E-03	low	NR	21
1,3-dichlorobenzene	NR	3.4E-02	2E-03	low	NR	17
1,4-dichlorobenzene	NR	1.2E-01	2E-01	medium	NR	0.6
1,2-dichloroethane	NR	9.6E-02	1E-03	low	NR	96
t-1,2-dichloroethylene	NR	1.0E-01	NA	NA	NR	NA
ethylbenzene	NR	5.7E-02	3E-01	low	NR	0.2
methylene chloride	NR	6.5E-01	9E-01	medium	NR	0.7
1,1,2,2-tetrachloroethane	NR	1.4E-02	NA	NA	NR	NA
tetrachloroethylene	NR	4.0E-05	1.4E-01	NA	NR	0.0003
toluene	NR	3.4E-01	1E-01	medium	NR	3
1,1,2-trichloroethane	NR	5.2E-03	NA	NA	NR	NA
trichloroethylene	NR	4.8E-03	NA	NA	NR	NA
vinyl chloride	NR	5.7E-03	NA	NA	NR	NA
xylenes (total)	NR	2.9E-01	NA	NA	NR	NA
Total Hazard Quotient/Pathway Hazard Index						241
Total Chronic Hazard Index for Ingestion + Inhalation					(Rounded) 239	(Rounded) 579

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Notes: (1) See Spreadsheet VI (ingestion).
(2) See Spreadsheet V (ingestion) and Spreadsheet II (inhalation).
(3) See Table 4.I.
(4) See Spreadsheet VII (ingestion) and Spreadsheet IX (inhalation), or formulas below.
(5) See Table 4.II.
CDI = Chronic Daily Intake.
RfD = Oral Reference Dose.
RfC = Inhalation Reference Concentration.
NA = Not available.
NR = Not relevant.

Formula: Adult Hazard Quotient (AHQ)= CHQ+(ACDI/RfD)

Formula: Child Hazard Quotient (CHQ)= (CCDI/RfD)

Table 4-12

Chronic Hazard Index Central Tendency Estimates - Noncarcinogens
CPS, Inc. - Old Bridge, New Jersey

Chemical	Child CDI (1) (mg/kg-d)	Adult CDI (2) (mg/kg-d)	RfD (3) (mg/kg-d)	Confidence Level	Child Hazard Quotient (CHQ) (4)	Adult Hazard Quotient (AHQ) (4)
Current Use - Residential Ingestion of Contaminated Drinking Water (RfD)						
benzene	6.3E-002	2.7E-002	3E-003	medium	21	9
chlorobenzene	5.8E-001	2.5E-001	2E-002	NA	29	12
1,2-dichlorobenzene	2.7E-001	1.2E-001	9E-002	low	3	1.3
1,3-dichlorobenzene	4.9E-002	2.1E-002	3E-002	low	1.6	0.7
1,4-dichlorobenzene	1.7E-001	7.3E-002	3E-002	NA	5.7	2.4
1,2-dichloroethane	1.4E-001	5.9E-002	3E-002	low	5	2
t-1,2-dichloroethylene	1.5E-001	6.3E-002	2E-002	low	7	3
ethylbenzene	8.5E-002	3.6E-002	1E-001	low	0.9	0.4
methylene chloride	9.4E-001	4.0E-001	6E-002	medium	16	7
1,1,2,2-tetrachloroethane	2.0E-002	8.6E-003	NA	NA	NA	NA
tetrachloroethylene	5.8E-005	2.5E-005	1E-002	medium	0.006	0.002
toluene	4.9E-001	2.1E-001	2E-001	medium	2	1.1
1,1,2-trichloroethane	7.6E-003	3.3E-003	4E-003	medium	2	1
trichloroethylene	6.7E-003	2.9E-003	6E-003	low	1.1	0.5
vinyl chloride	8.5E-003	3.6E-003	NA	NA	NA	NA
xylenes (total)	4.2E-001	1.8E-001	2E+000	medium	0.2	0.1
antimony	4.9E-004	2.1E-004	4E-004	low	1.2	0.5
arsenic	3.4E-003	1.5E-003	3E-004	medium	11	5
beryllium	3.8E-004	1.6E-004	2E-003	low	0.19	0.08
cadmium	1.2E-003	5.2E-004	5E-004	high	2	1
chromium (III)	6.3E-002	2.7E-002	1E+000	low	0.06	0.03
copper	1.7E+000	7.3E-001	4E-002	NA	43	18
thallium sulfate	9.4E-004	4.0E-004	8E-005	low	12	5
zinc	5.4E-001	2.3E-001	3E-001	medium	1.8	0.8
Total Hazard Quotient/Pathway Hazard Index (Ingestion)					(Rounded) 166	(Rounded) 71
Current Use - Residential Inhalation of Contaminated Drinking Water (RfD) (Showering scenario)						
benzene	NR	4.8E-002	3E-003	medium	NR	16
chlorobenzene	NR	8.4E-001	2E-002	NA	NR	42
1,2-dichlorobenzene	NR	3.9E-001	9E-002	low	NR	4.4
1,3-dichlorobenzene	NR	7.1E-002	3E-002	low	NR	2.4
1,4-dichlorobenzene	NR	2.5E-001	3E-002	NA	NR	8.2
1,2-dichloroethane	NR	2.0E-001	3E-002	low	NR	7
t-1,2-dichloroethylene	NR	2.1E-001	2E-002	low	NR	11
ethylbenzene	NR	1.2E-001	1E-001	low	NR	1.2
methylene chloride	NR	1.4E+000	6E-002	medium	NR	23
1,1,2,2-tetrachloroethane	NR	2.9E-002	NA	NA	NR	NA
tetrachloroethylene	NR	8.4E-005	1E-002	medium	NR	0.008
toluene	NR	7.1E-001	2E-001	medium	NR	3.6
1,1,2-trichloroethane	NR	1.1E-002	4E-003	medium	NR	3
trichloroethylene	NR	1.0E-002	6E-003	low	NR	1.7
vinyl chloride	NR	1.2E-002	NA	NA	NR	NA
xylenes (total)	NR	6.0E-001	2E+000	medium	NR	0.3
Total Hazard Quotient/Pathway Hazard Index (inhalation)						122
Total Hazard Quotient, Ingestion and Inhalation for Adult + Child (166 + 71 + 122)						359

Notes: (1) See Spreadsheet XI.
(2) See Spreadsheet X.
(3) See Table 4.I.
(4) See Spreadsheet XII (ingestion) and Spreadsheet XIV (inhalation).
CDI = Chronic Daily Intake.
RfD = Oral Reference Dose.
NA = Not available.
NR = Not required for child.

ORAI Job No. 91C907
D4863/RPT-TAB/HAZ-INDI.WK4

Table 4-13

Soil Chronic Hazard Index Estimates
Site Worker/Construction Worker - Current and Future Use
CPS, Inc. - Old Bridge, New Jersey

Metal	CDI (1) (mg/kg-d)	RfD (2) (mg/kg-d)	Confidence Level	Hazard Quotient
Current Use - Ingestion (Site Worker)				
arsenic	1.6E-06	3E-04	medium	0.005
Total Hazard Quotient/Pathway Hazard Index				0.005
Current Use -Total Chronic Hazard Index				0.005

Future Use - Ingestion (Construction Worker)				
arsenic	3.8E-06	3E-04	medium	0.01
Total Hazard Quotient/Pathway Hazard Index				0.01
Future Use - Total Chronic Hazard Index				**0.01**

Notes: (1) See Table 3.III.
(2) See Table 4.I.
CDI = Chronic Daily Intake.
RfD = Oral Reference Dose.

DRAI Job No. 91C907
D4883/RPT-TAB/HAZ-IND.WK4

Table 4-14

Soil Cancer Risk Estimates
Site Worker/Construction Worker Current and Future Use
CPS, Inc. - Old Bridge, New Jersey

Chemical	CDI (1) (mg/kg-d)	Slope Factor (2) (mg/kg-d)-1	Weight of Evidence	Chemical - Specific Risk (3)
Current Use - Site Worker				
arsenic	5.4E-07	1.5E+00	A	8.1E-07
Total Pathway Risk				8.1E-07
Current Use **Site Worker Population - Total Cancer Risk** (weight of evidence predominantly A)				8.1E-07
Future Use - Construction Worker				
arsenic	5.4E-08	1.5E+00	A	8.1E-08
Total Pathway Risk				8.1E-08
Future Use **Construction Worker Population - Total Cancer Risk** (weight of evidence predominantly A)				8.1E-08

Notes: (1) From Section 3.4, "Site Workers and Future Construction Worker Exposure Scenarios" for calculations.
(2) From Table 4.III.
(3) Based on Formula: $\boxed{\text{Adult Risk} = (\text{ACDI} * \text{SF})}$
CDI = Chronic Daily Intake.

DRAI Job No. 91C807
D4693/RPT-TAB/CAN-RIS.WK4

Table 4-15

Ground Water Cancer Risk Estimates
Residential - Current Use
CPS, Inc. - Old Bridge, New Jersey

Chemical	Child CDI (1) (mg/kg-d)	Adult CDI (2) (mg/kg-d)	Slope Factor $(mg/kg\text{-}d)^{-1}$	Weight of Evidence	Chemical-Specific (Cancer) Risk Child (3)	Chemical-Specific (Cancer) Risk Adult (4)
Ingestion of Contaminated Drinking Water						
benzene	7.7E-03	1.3E-02	3E-02	A	2.3E-04	6.2E-04
1,4-dichlorobenzene	2.1E-02	3.6E-02	2E-02	C	4.2E-04	1.1E-03
1,2-dichloroethane	1.7E-02	2.9E-02	9E-02	B2	1.5E-03	4.1E-03
methylene chloride	1.2E-01	2.0E-01	8E-03	B2	9.2E-04	2.5E-03
1,1,2,2-tetrachloroethane	2.5E-03	4.2E-03	2E-01	C	4.9E-04	1.3E-03
tetrachloroethylene	7.1E-06	1.2E-05	5E-02	C-B2	3.6E-07	9.7E-07
1,1,2-trichloroethane	9.3E-04	1.6E-03	6E-02	C	5.6E-05	1.5E-04
trichloroethylene	8.2E-04	1.4E-03	1E-02	C-B2	8.2E-06	2.2E-05
vinyl chloride	1.0E-03	1.8E-03	2E+00	A	2.1E-03	5.7E-03
arsenic	4.2E-04	7.2E-04	2E+00	A	8.4E-04	2.3E-03
beryllium	4.7E-05	8.1E-05	NA	B1	NA	NA
cadmium	1.5E-04	2.5E-04	NA	B1	NA	NA
Total Chemical Specific Risk/Total Pathway Risk					6.6E-03	1.78E-02
Total Excess Cancer Risk (Child and Adult)						2.4E-02
Inhalation of Vapor Phase Chemical During Showering Scenario						
benzene	NR	1.9E-02	3E-02	A	NR	5.6E-04
1,4-dichlorobenzene	NR	5.0E-02	2.2E-02	C	NR	1.1E-03
1,2-dichloroethane	NR	4.1E-02	9E-02	B2	NR	3.7E-03
methylene chloride	NR	2.8E-01	2E-03	B2	NR	5.6E-04
1,1,2,2-tetrachloroethane	NR	6.0E-03	2E-01	C	NR	1.2E-03
tetrachloroethylene	NR	1.7E-05	2E-03	C-B2	NR	3.4E-08
1,1,2-trichloroethane	NR	2.3E-03	6E-02	C	NR	1.4E-04
trichloroethylene	NR	2.0E-03	6E-03	C-B2	NR	1.2E-05
vinyl chloride	NR	2.4E-03	3E-01	A	NR	7.3E-04
Total Chemical Specific Risk/Total Pathway Risk						8.0E-03
Total Excess Cancer Risk for Ingestion and Inhalation (weight of evidence predominantly C and B2)						3.2E-02

Notes: (1) From Appendix C, Spreadsheet III.
(2) From Appendix C, Spreadsheet III (ingestion), Spreadsheet I (inhalation) or formulas below.
(3) Based on Formula: Child Risk = (CCDI*SF)
(4) Based on Formula: Adult Risk = (CR + (ACDI * SF))
CDI = Chronic Daily Intake.
NA = not available.
NR = not relevant.

DRAI Job No. 01C807
D4863/RPT-TAB/CAN-RIS.WK4

APPENDIX 1

PHASE 1 DATA

Soil Sample Designations and Analytical Parameters
CPS Chemical Company
Old Bridge, New Jersey

Sample No.	AEC Designation	Parameter
SB1-1-0.5-1	1	VOC+15, PPM
SB1-1-1-1.5	1	VTCL+, BTCL+
SB1-1-2.5-3	1	VOC+15, PPM
SB1-1-4.5-5	1	VTCL+, BTCL+, PPM, pH
SB1-2-1-2	1	VOC+15, PPM
SB1-2-3-4	1	VOC+15, PPM, pH
SB1-2-5-6	1	VOC+15, PPM
SB2-3-0.5-2	2	VTCL+, BTCL+, pH
SB2-3-5-6	2	VOC+15, pH
SB2-3-7-8	2	VOC+15, pH
SB2-4-0.5-2	2	VTCL+, BTCL+
SB2-4-4-5	2	VOC+15, pH
SB2-4-7-7.5	2	VOC+15, pH
SB2-5-0.5-1	2	VOC+15, pH
SB2-5-3-4	2	VTCL+, pH
SB2-5-5-6	2	VTCL+, pH
SB3-5-1.5-2	3	VOC+15, pH
SB3-5-3.5-4	3	PPM
SB3-5-4.5-6	3	BTCL+, VTCL+, pH
SB3-5-7.5-8	3	VOC+15, pH
SB3-6-1.5-2	3	VOC+15, pH
SB3-6-3.5-4	3	VOC+15, pH
SB3-6-7.5-8	3	VOC+15, pH
SB3-7-0.5-1	3	VOC+15, pH
SB3-7-4-5	3	VOC+15, pH
SB3-7-7.5-8	3	VTCL+, BTCL+
SB3-8-1-2	3	VOC+15, pH
SB3-8-4.5-5	3	VOC+15, pH
SB3-8-7.5-8	3	VOC+15, pH
SB4-9-1.0-1.5	4	VOC+15, pH
SB4-9-3.5-4	4	VOC+15, pH
SB4-9-7-7.5	4	VOC+15, pH
SB4-10-1-1.5	4	VTCL+, BTCL+
SB4-10-3-4	4	VOC+15, pH
SB4-10-5-6	4	VOC+15, pH
SB4-11-1-2	4	VTCL+, BTCL+
SB4-11-3-4	4	VOC+15, pH
SB4-11-5-6	4	VOC+15, pH
SB4-12-0.5-2	4	VOC+15, PPM, pH
SB4-12-4.5-5	4	VOC+15, PPM, pH
SB4-12-7-8	4	VOC+15, PPM
SB5-1-0.5-1	5	VTCL+, pH
SB5-1-2-2.5	5	VTCL+, pH
SB5-1-5.5-6	5	VTCL+, pH
SB5-2-0.5-1	5	VTCL+, pH
SB5-2-1.5-2	5	VTCL+, pH
SB5-2-5-5.5	5	VTCL+, pH
SB5-3-3.5-4	5	VTCL+, BTCL+, pH

SB1-1-0.5-1 = Soil boring SB1 located in AEC 1; collected from 0.5 to 1 foot below ground surface.

DRAI Job No. 91C907

DJ-1418/SBDESIGN.WK1

AEC = Area of Environmental Concern.
VOC+15 = Volatile Organic Compounds plus a 15 compound library search.
PPM = Priority Pollutant Metals.
VTCL+ = Volatile Target Compound List plus a 10 compound library search.
BTCL+ = Base/Neutral Target Compound List plus a 10 compound library search.
RL = Random Location.
DL = Downgradient Location.
BG = Background Location.
PB = Locations along Pricketts Brook.
EW = Locations immediately surrounding downgradient well EPA-4.

Table 1 (Cont'd)

Soil Sample Designations and Analytical Parameters
CPS Chemical Company
Old Bridge, New Jersey

Sample No.	AEC Designation	Parameter
SB5-3-5-6	5	VTCL+, BTCL+, pH
SBR-13-0.5-1	RL	VTCL+, pH
SBR-13-3-4	RL	VTCL+, pH
SBR-13-7-8	RL	VTCL+, pH
SBR-14-0.5-1	RL	VTCL+, pH
SBR-14-4-5	RL	VTCL+, pH
SBR-14-7-8	RL	VTCL+, pH
SBR-15-0.5-1.5	RL	VTCL+, pH
SBR-15-3-4	RL	VTCL+, pH
SBR-15-5-6	RL	VTCL+, pH
SBR-16-0.5-1.5	RL	VTCL+, pH
SBR-16-4-5	RL	VTCL+, pH
SBR-16-7-8	RL	VTCL+, pH
SBR-17-0.5-1	RL	VTCL+, pH
SBR-17-4-5	RL	VTCL+, pH
SBR-17-7-8	RL	VTCL+, pH
SBR-18-1.5-2	RL	VOC+15, pH
SBR-18-4.5-5	RL	VOC+15, pH
SBR-18-7.5-8	RL	VOC+15, pH
SBR-19-0.5-1.5	RL	VOC+15, pH
SBR-19-2-3	RL	VOC+15, pH
SBR-19-5-6	RL	VOC+15, pH
SBR-20-1-2	RL	VOC+15, PPM
SBR-20-3-4	RL	VOC+15, PPM
SBR-20-5-6	RL	VOC+15, PPM, pH
SBR-21-1-2	RL	VOC+15, PPM
SBR-21-3-4	RL	VOC+15, PPM, pH
SBR-21-4.5-5.5	RL	VOC+15, PPM
SBBG-0.5-1	BG	VOC+15, PPM, pH
SBBG-3-4	BG	VTCL+, pH
SBBG-5-6	BG	VOC+15, BTCL+, pH
SB22-0.5-1	PB	VOC+15
SB22-2.5-3	PB	VOC+15
SB22-3-4	PB	VOC+15
SB23-0.5-1	PB	VOC+15
SB23-1.5-2	PB	VOC+15
SB24-0.5-1	PB	VOC+15
SB24-1.5-2	PB	VOC+15
SB24-2-2.5	PB	VOC+15
SB25-0.5-1	PB	VOC+15
SB25-1.5-2	PB	VOC+15
SB25-2-2.5	PB	VOC+15
SBE-1-0.5-1	PB	VTCL+, BTCL+
SBE-1-5.5-6	EW	VOC+15
SBE-1-13-14	EW	VOC+15
SBE-2-0.5-1	EW	VTCL+, BTCL+
SBE-2-5.5-6	EW	VOC+15
SBE-2-11-12	EW	VOC+15
SBE-3-0.5-1	EW	VOC+15
SBE-3-5.5-6	EW	VOC+15
SBE-3-13-14	EW	VOC+15
SBE-4-0.5-1	EW	VOC+15
SBE-4-6-6.5	EW	VOC+15
SBE-4-11-12	EW	VOC+15

SB1-1-0.5-1 = Soil boring SB1 located in AEC 1; collected from 0.5 to 1 foot below ground surface.

DRAI Job No. 91C907
DJ-1410/SBDESIGN.WK1

AEC = Area of Environmental Concern.
VOC+15 = Volatile Organic Compounds plus a 15 compound library search.
PPM = Priority Pollutant Metals.
VTCL+ = Volatile Target Compound List plus a 10 compound library search.
BTCL+ = Base/Neutral Target Compound List plus a 10 compound library search.
RL = Random Location.
DL = Downgradient Location.
BG = Background Location.
PB = Locations along Pricketts Brook.
EW = Locations immediately surrounding downgradient well EPA-4.

Table II
Monitoring Well Construction Specifications
CPS Chemical Company
Old Bridge, New Jersey

Well	Total Depth (feet) Well Log	Total Depth (feet) Field Measurement	Screened Interval (feet)	Inner Diameter (inches)	Material
WE-2	25	26.81[1]	23-25	1.25	PVC
WE-3	25	26.35[1]	23-25	1.25	PVC
WE-4	25	27.13[1]	23-25	1.25	PVC
WCC-4S	--	34.15[1]	--	4	PVC
WCC-5S	--	35.12[2]	--	4	PVC
WCC-6S	--	36.0[2]	--	4	PVC

(--) = indicates well log not available.

(1) = average total depth value of measurements taken on 11/4/92 and 2/24/93.

(2) = total depth measurement taken on 2/24/93.

DRAI Job No. 91C907

D1410/MWCS.WK1

Table III
Summary of Monitoring Well and Ground–Surface Elevations
CPS Chemical Company
Old Bridge, New Jersey

Well	Top–of–Outer Casing Elevation (ft. msl)	Top–of–Inner Casing Elevation (ft. msl)	Ground–Surface Elevation (ft. msl)
WE–2	27.93	27.71	25.90
WE–3	25.81	25.66	23.88
WE–4	25.27	24.86	22.72
WCC–4S	22.80	22.80	22.79
WCC–5S	26.13	25.97	25.16
WCC–6S	26.20	25.92	24.55

msl = mean sea level.

DRAI Job No. 91C907

D1410/TOCGSEM.WK1

Table IV
Summary of Depth–to–Water Measurements and Ground–Water Elevations
CPS Chemical Company
Old Bridge, New Jersey

Well No.	Depth–to–Water (ft.) 11/4/92	12/3/92	2/24/93	3/25/93	Ground–Water Elevation (ft. msl) 11/4/92	12/3/92	2/24/93	3/25/93
WCC–6S	––	11.57	7.95	5.73	––	14.35	17.97	20.19
WE–2	13.7	14.30	10.44	8.31	14.01	13.41	17.27	19.40
WCC–5S	––	––	8.62	6.60	––	––	17.35	19.37
WE–3	11.22	11.22	7.83	5.83	14.44	13.93	17.83	19.83
WE–4	10.08	10.37	6.40	4.55	14.78	14.49	18.46	20.31
WCC–4	7.42	7.84	4.07	2.20	15.38	14.96	18.73	20.60

–– Measurement not taken.

DRAI Job No. 91C907

D1410/MEAS-ELE.WK1

Table V
Summary of Ground-Water Sampling Measurements and Calculations
CPS Chemical Company
Old Bridge, New Jersey

DATE: December 3, 1992 DRAI PERSONNEL: Grant Gikas

Well No. or Name	Time	Total Depth (ft)	-static- (TOIC)	Diff. (ft)	*Multi-plier	Est. Vol (gal) (3 vol)	HNU (ppm)	PRE-PURGE T (°C)	PRE-PURGE pH (su)	PRE-PURGE Cond. (umho/cm)	Pump Type	Time Pump On	Time Pump Off	Purge Vol. (gal)	Water Conditions
WE-3	9:35	26.60	11.73	14.87	0.60	9	<1	15.2	4.39	240	JET	10:42	10:50	10	
WCC-4	9:50	34.30	7.84	26.46	0.75	19.8	<1	14.4	4.67	200	JET	11:09	11:20	20	
WCC-6	10:00	36.20	11.57	24.63	0.75	18.6	1	16.0	4.86	300	JET	11:32	11:42	20	
WE-4	10:10	27.30	10.37	16.93	0.60	10.2	<1	13.8	6.74	290	JET	11:56	12:05	10.5	
WE-2	10:20	27.10	14.30	12.80	0.60	7.8	2	14.1	6.36	600	JET	12:25	12:40	7.8	Odor, Fine Gray Sand
PW1	--	--	--	--	--	--	--	--	--	--	--	--	--	--	
PW2	--	--	--	--	--	--	--	--	--	--	--	--	--	--	

Well No. or Name	80% Recov (ft)	Sample Time	Depth To Water(ft)	PRE-SAMPLE T (°C)	PRE-SAMPLE pH (su)	PRE-SAMPLE Cond (umho/cm)	PRE-SAMPLE D O (ppm)
WE-3	14.71	11:30	--	13.0	4.78	215	2.8
WCC-4	13.14	12:15	7.80	15.0	5.10	190	7.0
WCC-6	16.50	13:00	11.70	15.2	5.01	310	5.4
WE-4	13.76	13:30	10.09	14.0	5.61	245	2.2
WE-2	16.66	14:55	14.35	14.9	6.21	625	2.6
PW1	--	--	--	14.5	4.73	490	10.0
PW2	--	--	--	12.6	4.44	250	8.8

Total depth includes inner stick-up height.
Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.
80% recovery is calculated by subtracting 80% of the water column height from the total depth
[Total Depth - (0.80 x Water Column)].
PW1 and PW2 are production wells. The wells were pumping prior to sampling, therefore no pre-prurge samples were taken.

DRAI Job No. 92C1022
D1410/PRE-PURG.WK1

Table VI
Summary of Ground-Water Sampling Measurements and Calculations
CPS Chemical Company
Old Bridge, New Jersey

DATE: February 4, 1993 DRAI Field Supervisor: Maria Coler

Well No. or Name	Time	Total Depth (ft)	-static- (TOIC)	Diff. (ft)	Est. Vol (gal) (3 vol)	PRE-PURGE T (°C)	PRE-PURGE pH (su)	PRE-PURGE Cond. (umho/cm)	Diss. O2 (mg/l)	Pump Type	Time Pump On	Time Pump Off	Purge Vol. (gal)	Water Conditions
WCC-5S	14:15	34.71	8.99	25.72	12.54	12	4.39	250	5.0	SUB	15:00	15:13	13.0	clear
WE-2	14:56	26.92	10.76	16.16	3.0	9	5.93	300	6.8	JET	15:34	15:37	4.0	cloudy, odor

Well No. or Name	80% Recov (ft)	Sample Time	Depth To Water (ft)	PRE-SAMPLE T (°C)	PRE-SAMPLE pH (su)	PRE-SAMPLE Cond (umho/cm)	PRE-SAMPLE DO (ppm)	PRE-SAMPLE Salinity (ppt)
WCC-5S	14.13	15:45	9.00	8	4.19	200	3.7	<1
WE-2	13.99	16:00	10.86	8	5.32	1,000	2.2	2

Total depth includes inner stick-up height.
Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.
80% recovery is calculated by subtracting 80% of the water column height from the total depth
[Total Depth - (0.80 x Water Column)].

DRAI Job No. 92C1022
D1410/PREPURG2.WK1

Table VII
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB1-1	SB1-1	SB1-1	SB1-1	SB1-2	SB1-2	SB1-2	SB2-3	SB2-3	SB2-3	SB2-4	SB2-4
Depth (ft below surface):	0.5-1	1-1.5	2.5-3	4.5-5	1-2	3-4	5-6	0.5-2	5-6	7-8	0.5-2	4-5
Lab Sample No.:	E229020	E229021	E229022	E229023	E229014	E229015	E229016	E228868	E228869	E228870	E228865	E228866
Date Sampled:	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/5/92	11/5/92	11/5/92	11/5/92	11/5/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	ND	210	ND	46	660 E	1100 E	440 E	1300	230	60	16000	33000 E
Acrolein	ND	NA	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND
Acrylonitrile	ND	NA	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	ND	NA
Carbon Disulfide	NA	ND	NA	ND	NA	NA	NA	ND	NA	NA	ND	NA
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	14	29	ND	16	ND	ND	ND	ND	ND	4.1 J
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	110	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	130	ND	ND	ND	ND	ND	ND	ND	ND	ND	4.3 J
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	5.9	ND	2.1 J	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	48	6.3	8.3	ND	6.8	ND	4.0 J	ND	ND	21	4.3 J
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	NA	ND	ND	ND	ND	ND	NA	ND	ND	ND	ND
Styrene	NA	ND	NA	ND	NA	NA	NA	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	33	ND	6	ND	ND	ND	ND	ND	ND	10	ND
TOTAL TARGETED VOCs (ppb):	ND	536.9	20.3	91.4	660	1122.8	440	1304	230	60	16031	33012.7
TOTAL NON-TARGETED VOCs (ppb):	ND	ND	ND	ND	62	116	41	ND	40	ND	ND	1600
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	ND	536.9	20.3	91.4	722	1238.8	481	1304	270	60	16031	34612.7

See notes at end of table.

DRAI Job No. 91C987

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB2-4	SB2-5	SB2-5	SB2-5	SB3-5	SB3-5	SB3-5	SB3-6	SB3-6	SB3-6	SB3-7	SB3-7
Depth (ft below surface):	7-7.5	0.5-1.5	3-4	5-6	1.5-2.0	4.5-6.0	7.5-8.0	1.5-2.0	3.5-4.0	7.5-8.0	0.5-1	4-5
Lab Sample No.:	E228867	E229017	E229018	E229019	E228730	E228732	E228733	E228734	E228735	E228736	E228850	E228851
Date Sampled:	11/5/92	11/6/92	11/6/92	11/6/92	11/4/92	11/4/92	11/4/92	11/4/92	11/4/92	11/4/92	11/5/92	11/5/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	460 E	34000 E	2600	1900	1700 E	9600	17000 E	570 E	830	2000 E	ND	220
Acrolein	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	16	ND	ND	94 J	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	NA	NA	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA
Carbon Disulfide	NA	NA	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	760	ND	ND	1100	190	91	3500	ND	390	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	30	ND	ND	20000	ND
1,3-Dichlorobenzene	ND	ND	120	ND	ND	22	ND	15	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	110	ND	ND	38	11 J	ND	210 J	ND	ND	550
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	30	ND	ND	120	ND	15	1000	ND	510	ND
2-Hexanone	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	NA	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	7.7	19	ND	4.8 J	11 J	19 J	7.4	ND	ND	640	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	ND	NA	ND	ND	NA	ND	NA	NA	NA	NA	NA	NA
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	290	ND	ND	140	86	60	23000	ND	5600	ND
TOTAL TARGETED VOCs (ppb):	460	34007.7	3929	1900	1704.8	11047	17306	788.4	28634	2000	27140	770
TOTAL NON-TARGETED VOCs (ppb):	60	3000	23	ND	270	60	2500	134	1200	288	11450	53
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	520	37007.7	3952	1900	1974.8	11107	19806	922.4	29834	2288	38590	823

See notes at end of table.

DRAI Job No. 91C907

93-1410/VOC-SOIL.WS1

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB3-7	SB3-8	SB3-8	SB3-8	SB4-9	SB4-9	SB4-9	SB4-10	SB4-10	SB4-10	SB4-11	SB4-11
Depth (ft below surface):	7.5-8	1-2	4.5-5	7.5-8	1.0-1.5	3.5-4.0	7.0-7.5	1-1.5	3-4	5-6	1-2	3-4
Lab Sample No.:	E228852	E228853	E228854	E228855	E228740	E228741	E228742	E228859	E228860	E228861	E228856	E228857
Date Sampled:	11/5/92	11/5/92	11/5/92	11/5/92	11/4/92	11/4/92	11/4/92	11/5/92	11/5/92	11/5/92	11/5/92	11/5/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	480	ND	ND	110	1400 E	290 E	ND	11000	2900 E	1000 E	63	500 E
Acrolein	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	ND
Acrylonitrile	NA	ND	ND	ND	ND	ND	ND	NA	ND	NA	NA	ND
Benzene	NA	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	ND	NA
Carbon Disulfide	ND	NA	NA	NA	NA	NA	ND	ND	NA	NA	ND	NA
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	37	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	8.1	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	NA	NA	NA	NA	ND	ND	ND	NA	NA	ND	NA	NA
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND
trans-1,2-Dichloroethylene	NA	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	NA	NA	NA	ND	ND	ND	ND	NA	ND	ND	NA
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND
4-Methyl-2-Pentanone	80	NA	NA	NA	ND	ND	ND	ND	NA	ND	ND	NA
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	3.2 J	ND	ND	ND	ND	4 J	14
Toluene	3.5 J	23	19	33	ND	9.4	ND	6.1	25	ND	13	72
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	NA	ND	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND
Styrene	ND	NA	NA	NA	NA	NA	ND	ND	NA	ND	ND	NA
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED VOCs (ppb):	571.6	23	19	143	1400	302.6	ND	11006.1	2962	1000	80	586
TOTAL NON-TARGETED VOCs (ppb):	232	31	6	ND	61	79	ND	ND	160	74	ND	22
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	803.6	54	25	143	1461	381.6	ND	11006.1	3122	1074	80	608

See notes at end of table.

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB4-11	SB4-12	SB4-12	SB4-12	SB5-1	SB5-1	SB5-1	SB5-2	SB5-2	SB5-2	SB5-3	SB5-3
Depth (ft below surface):	5-6	0.5-2	4-5.5	7-8	0.5-1	2-2.5	5.5-6	0.5-1	1.5-2	5-5.5	3.5-4	5-6
Lab Sample No.:	E228858	E228862	E228863	E228864	E229042	E229043	E229044	E229045	E229046	E229047	E229048	E229049
Date Sampled:	11/5/92	11/5/92	11/5/92	11/5/92	11/9/92	11/9/92	11/9/92	11/9/92	11/9/92	11/9/92	11/9/92	11/9/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	340 E	340 E	5100 E	1700	56	ND	73	220	ND	28	950	1800
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	610 E	6600	ND	1100	44 J	ND	97	ND	97	370
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	NA	NA	ND	NA	NA	NA	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	11	68	4.3	ND	ND	ND 1	ND 1	ND 1	ND	150
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	120	3.7	ND 1	ND 1	ND 1	6.9	120
1,4-Dichlorobenzene	ND	ND	19	55 J	8.7	430	17	ND 1	ND 1	ND 1	35	360 E
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	34	640	ND	170	13	ND	ND	ND	ND	18
2-Hexanone	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	NA	ND	ND	ND	ND	NA	NA	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	10	ND	8.1	ND	ND	ND	4.0 J	ND	4.3 J	2.5 J	4.8 J	20
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	NA	NA	NA	NA	NA	NA	NA	NA	NA
Styrene	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	30	3600	ND	1500	120	ND	6.2	ND	2.0 J	210
TOTAL TARGETED VOCs (ppb):	350	340	5812.1	12663	69	3320	274.7	220	107.5	30.5	1098.7	3048
TOTAL NON-TARGETED VOCs (ppb):	21	10	383	200	16	2280	82	ND	22	ND	65	900
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	371	350	6195.1	12863	85	5600	356.7	220	129.5	30.5	1163.7	3948

See notes at end of table.

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SBR-13	SBR-13	SBR-13	SBR-14	SBR-14	SBR-14	SBR-15	SBR-15	SBR-15	SBR-16	SBR-16	SBR-16
Depth (ft below surface):	0.5-1	3-4	7-8	0.5-1	4-5	7-8	0.5-1.5	3-4	5-6	0.5-1.5	4-5	7-8
Lab Sample No.:	E228991	E228990	E228992	E228993	E228994	E228995	E228999	E229001	E229000	E229002	E229003	E229004
Date Sampled:	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	200	300	86	ND	30	84	4600	9900	3300	3100	230	210
Acrolein	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Acrylonitrile	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	5.9 J	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	ND	ND	ND	ND
1,3-Dichlorobenzene	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	9.6	ND	ND	ND
1,4-Dichlorobenzene	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	ND 1	35	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	15	ND	ND	ND	ND	ND	ND	2.5 J	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	1.6 J	4.6 J	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	11	5.2 J	ND	6.2	ND	ND	ND
Toluene	18	12	ND	ND	5.8	34	14	ND	19	74 J	8.4	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	NA	NA	NA
Styrene	ND	NA	ND	ND	NA	NA	NA	NA	NA	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	150	ND	ND	ND	ND	ND	ND	11	270	ND	ND
TOTAL TARGETED VOCs (ppb):	218	477	86	ND	37.4	139.5	4619.2	9900	3383.3	3444	238.4	210
TOTAL NON-TARGETED VOCs (ppb):	ND	373	ND	ND	ND	ND	ND	ND	73	550	ND	ND
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	218	850	86	ND	37.4	139.5	4619.2	9900	3456.3	3994	238.4	210

See notes at end of table.

DRAI Job No. 91C987

93-1810/VOC-SOIL.WK1

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SBR-17	SBR-17	SBR-17	SBR-18	SBR-18	SBR-18	SBR-19	SBR-19	SBR-19	SBR-20	SBR-20	SBR-20
Depth (ft below surface):	0.5-1	4-5	7-8	1.5-2.0	4.5-5.0	7.5-8.0	0.5-1.5	2-3	5-6	1-2	3-4	5-6
Lab Sample No.:	E228996	E228997	E228998	E228737	E228738	E228739	E229005	E229006	E229007	E229008	E229009	E229010
Date Sampled:	11/6/92	11/6/92	11/6/92	11/4/92	11/4/92	11/4/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	45000	8200	1500	580 E	ND	370 E	270 E	ND	ND	450 E	ND	290 E
Acrolein	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	NA	NA	NA	NA	NA	NA
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND 1	ND 1	ND 1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND 1	ND 1	ND 1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND 1	ND 1	ND 1	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	12	ND	ND	11000	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	12	ND	ND	6.3	ND	ND	ND	ND	ND
Toluene	14	30	ND	33	ND	ND	ND	ND	ND	8.9	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	ND
Styrene	NA	NA	NA	ND	ND	ND	NA	NA	NA	NA	NA	NA
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	93	ND	23	58000	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED VOCs (ppb):	45014	8335	1500	648	69000	370	276.3	ND	ND	458.9	ND	290
TOTAL NON-TARGETED VOCs (ppb):	ND	ND	ND	86	ND	26	31	8	18	39	ND	29
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	45014	8335	1500	734	69000	396	307.3	8	18	497.9	ND	319

See notes at end of table.

DRAI Job No. 91C987

93-1110/VOC-SOIL.WK1

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SBR-21	SBR-21	SBR-21	SBBG	SBBG	SBBG	SB22	SB22	SB22	SB23	SB23	SB24
Depth (ft below surface):	1-2	3-4	4.5-5.5	0.5-1.0	3.0-4.0	5.0-6.0	0.5-1	2.5-3	3-4	0.5-1	1.5-2	0.5-1
Lab Sample No.:	E229011	E229012	E229013	E228727	E228728	E228729	E229933	E229934	E229935	E229936	E229937	E229938
Date Sampled:	11/6/92	11/6/92	11/6/92	11/4/92	11/4/92	11/4/92	11/18/92	11/18/92	11/18/92	11/18/92	11/18/92	11/18/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	450	ND	610 E	1800 E	2900	2200 E	ND	20	18	20	16	18
Acrolein	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	NA	NA	NA	NA	ND	NA	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NA	NA	NA	NA	ND	NA	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	19	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	16	ND	6.5	59	ND	2.0 J	5.8	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	NA	ND	ND	ND	ND	ND	ND	ND
Styrene	NA	NA	NA	NA	ND	NA	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	6.4	ND	ND	ND	ND	ND	ND
TOTAL TARGETED VOCs (ppb):	466	ND	616.5	1878	2900	2208.4	5.8	20	18	20	16	18
TOTAL NON-TARGETED VOCs (ppb):	32	23	57	91	6	320	ND	ND	ND	ND	ND	ND
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	498	23	673.5	1969	2906	2528.4	5.8	20	18	20	16	18

See notes at end of table.

DRAI Job No. 91C987
[illegible]

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB24	SB24	SB25	SB25	SB25	SBE-1	SBE-1	SBE-1	SBE-2	SBE-2	SBE-2	SBE-3
Depth (ft below surface):	1.5-2	2-2.5	0.5-1	1.5-2	2-2.5	0.5-1	5.5-6	13-14	0.5-1	5.5-6	11-12	0.5-1
Lab Sample No.:	E229939	E229940	E229941	E229942	E229943	E229841	E229842	E229843	E229844	E229845	E229846	E229847
Date Sampled:	11/18/92	11/18/92	11/18/92	11/18/92	11/18/92	11/17/92	11/17/92	11/17/92	11/17/92	11/17/92	11/17/92	11/17/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	51	14	24	3.8 J	53	1600	4900 E	1800 E	4300	700 E	2900 E	3400 E
Acrolein	NA	ND	ND	ND	ND	NA	ND	ND	NA	ND	ND	ND
Acrylonitrile	NA	ND	ND	ND	ND	NA	ND	ND	NA	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	NA
Carbon Disulfide	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	NA
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	NA
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	NA
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	16	ND	ND	6.3	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	6.4 J	ND	6.2	6.8	ND	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	NA	ND	ND	NA	ND	ND	ND
Styrene	ND	ND	ND	ND	ND	ND	NA	NA	ND	NA	NA	NA
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED VOCs (ppb):	73.4	14	30.2	16.9	53	1600	4900	1800	4300	700	2900	3400
TOTAL NON-TARGETED VOCs (ppb):	10	ND	ND	ND	41	ND	480	180	ND	69	260	320
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	83.4	14	30.2	16.9	94	1600	5380	1980	4300	769	3160	3720

See notes at end of table.

DRAI Job No. 91C987
93-1110/VOC-SOIL.WS1

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SBE-3	SBE-3	SBE-4	SBE-4	SBE-4	TB	FB	TB	FB	TB	FB	TB
Depth (ft below surface):	5.5-6	13-14	0.5-1	6-6.5	11-12	--	--	--	--	--	--	--
Lab Sample No.:	E229848	E229849	E229850	E229851	E229852	E228743	E228726	E228848	E228849	E228968	E228969	E229040
Date Sampled:	11/17/92	11/17/92	11/17/92	11/17/92	11/17/92	11/3/92	11/4/92	11/4/92	11/5/92	11/5/92	11/6/92	11/9/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)												
Acetone	210	1500 E	110	730 E	3100 E	ND	ND	2.2 J	ND	ND	ND	ND
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Butanone	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
Carbon Disulfide	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND 1	ND	ND 1	ND	ND 1
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND 1	ND	ND 1	ND	ND 1
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND 1	ND	ND 1	ND	ND 1
1,2-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane (Total)	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Hexanone	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Methyl-2-Pentanone	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	3.8 J	ND	14	ND	ND	ND	ND	ND	ND	ND
Toluene	ND	ND	3.0 J	ND	14	ND	ND	ND	ND	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Styrene	NA	NA	NA	NA	NA	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylene, Total	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED VOCs (ppb):	210	1500	116.8	730	3128	ND	ND	2.2	ND	ND	ND	ND
TOTAL NON-TARGETED VOCs (ppb):	21	130	ND	190	975	ND	ND	ND	ND	ND	ND	ND
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	231	1630	116.8	920	4103	ND	ND	2.2	ND	ND	ND	ND

See notes at end of table.

DRAI Job No. 91C987

93-1410/VOC-SOIL.WK1

Table VII (Cont'd)
Summary of Volatile Organic Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	FB		FB		TB		FB	
Depth (ft below surface):	--		--		--		--	
Lab Sample No.:	E229041		E229840		E229931		E229932	
Date Sampled:	11/9/92		11/17/92		11/17/92		11/18/92	
Laboratory:	Accutest		Accutest		Accutest		Accutest	
Targeted VOCs (ppb)								
Acetone	ND		ND		9.7	J	11	
Acrolein	ND		ND		ND		ND	
Acrylonitrile	ND		ND		ND		ND	
Benzene	ND		ND		ND		ND	
Bromoform	ND		ND		ND		ND	
Bromodichloromethane	ND		ND		ND		ND	
Bromomethane	ND		ND		ND		ND	
2-Butanone	ND		NA		ND		ND	
Carbon Disulfide	ND		NA		ND		ND	
Carbon Tetrachloride	ND		ND		ND		ND	
Chlorobenzene	ND		ND		ND		ND	
Chloroethane	ND		ND		ND		ND	
2-Chloroethyl Vinyl Ether	ND		ND		ND		ND	
Chloroform	ND		ND		ND		ND	
Chloromethane	ND		ND		ND		ND	
cis-1,3-Dichloropropene	ND		ND		ND		ND	
Dibromochloromethane	ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND	
1,3-Dichlorobenzene	ND		ND		ND		ND	
1,4-Dichlorobenzene	ND		ND		ND		ND	
1,1-Dichloroethane	ND		ND		ND		ND	
1,2-Dichloroethane	ND		ND		ND		ND	
1,2-Dichloroethene (Total)	ND		ND		ND		ND	
1,1-Dichloroethylene	ND		ND		ND		ND	
trans-1,2-Dichloroethylene	ND		ND		ND		ND	
trans-1,3-Dichloropropene	ND		ND		ND		ND	
1,2-Dichloropropane	ND		ND		ND		ND	
Ethylbenzene	ND		ND		ND		ND	
2-Hexanone	ND		ND		ND		ND	
Methylene Chloride	ND		ND		ND		ND	
4-Methyl-2-Pentanone	ND		ND		ND		ND	
1,1,2,2-Tetrachloroethane	ND		ND		ND		ND	
Tetrachloroethylene	ND		ND		ND		ND	
Toluene	ND		ND		ND		ND	
1,1,1-Trichloroethane	ND		ND		ND		ND	
1,1,2-Trichloroethane	ND		ND		ND		ND	
Trichloroethylene	ND		ND		ND		ND	
Trichlorofluoromethane	ND		ND		ND		ND	
Styrene	ND		ND		ND		ND	
Vinyl Chloride	ND		ND		ND		ND	
Xylene, Total	ND		ND		ND		ND	
TOTAL TARGETED VOCs (ppb):	ND		ND		9.7		11	
TOTAL NON-TARGETED VOCs (ppb):	ND		ND		ND		ND	
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	ND		ND		9.7		11	

See notes at end of table.

Table VIII
Summary of Priority Pollutant Metals
in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB1-1	SB1-1	SB1-1	SB1-2	SB1-2	SB1-2	SB3-5	SB4-12
Depth (ft below surface):	0.5-1	2.5-3.0	4.5-5.0	1.0-2.0	3.0-4.0	5.0-6.0	3.5-4.0	0.5-2
Lab Sample No.:	E229020	E229022	E229023	E229014	E229015	E229016	E228731	E228862
Date Sampled:	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92	11/4/92	11/5/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Metals (ppm)								
Antimony	1.4	ND	ND	ND	ND	ND	ND	ND
Arsenic	1.7	1.3	2.6	1.0	1.6	1.9	2.1	0.68
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	2.3	ND	ND	ND	ND	ND	ND	ND
Chromium	36	14	38	8	7.5	26	6.0	5.6
Copper	92	2.9	4.5	36	15	3.4	5.0	4
Lead	130	6.1	5.1	22	10	3.2	4.6	6.5
Mercury	0.14	ND	ND	ND	ND	ND	ND	ND
Nickel	27	ND	ND	4.2	4.9	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
Silver	1.5	NA	NA	1.2	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	1000	17	21	170	73	19	12.0	8

ND = not detected.
NA = not analyzed.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907

D1410/PPMET.WK1

Table VIII (Cont'd)
Summary of Priority Pollutant Metals in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB4-12	SB4-12	SBBG	SBR-20	SBR-20	SBR-20	SBR-21	SBR-21
Depth (ft below surface):	4-5.5	7-8	0.5-1.0	1.0-2.0	3.0-4.0	5.0-6.0	1.0-2.0	3.0-4.0
Lab Sample No.:	E228863	E228864	E228727	E229008	E229009	E229010	E229011	E229012
Date Sampled:	11/5/92	11/5/92	11/4/92	11/6/92	11/6/92	11/6/92	11/6/92	11/6/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Metals (ppm)								
Antimony	ND	1.6	ND	ND	ND	ND	1.5	ND
Arsenic	0.74	2.5	3.1	2.9	1.8	10	4.6	1.2
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	1.1	ND	0.74	ND	ND	2.9	ND
Chromium	11	25	9.3	18	9.5	17	49	8.6
Copper	20	97	16	58	4.3	2.6	210	3
Lead	8.6	30	20	25	4.5	4.6	130	9.7
Mercury	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ND	57	6.5	10	4.4	ND	46	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	1.1	ND	ND	3.1	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	54	370	74	390	76	15	1600	11

ND = not detected.

NA = not analyzed.

B = compound detected in method blank and excluded from total.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907

B1410/PPMET.WK1

Table VIII (Cont'd)
Summary of Priority Pollutant Metals
in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SBR-21	Field Blank	Field Blank	Field Blank
Depth (ft below surface):	4.5-5.5			
Lab Sample No.:	E229013	E228726	E228849	E228889
Date Sampled:	11/6/92	11/4/92	11/5/92	11/6/92
Laboratory:	Accutest	Accutest	Accutest	Accutest
Metals (ppm)				
Antimony	0.50	ND	ND	ND
Arsenic	1.3	ND	ND	ND
Beryllium	<0.50	ND	ND	ND
Cadmium	<0.50	ND	ND	ND
Chromium	5.9	ND	ND	ND
Copper	2.4	ND	ND	ND
Lead	5.3	ND	ND	ND
Mercury	<0.10	ND	ND	ND
Nickel	<4.0	ND	ND	ND
Selenium	<0.50	ND	ND	ND
Silver	<1.0	ND	ND	ND
Thallium	<0.50	ND	ND	ND
Zinc	8.4	0.079	0.056	0.08

ND = not detected.
NA = not analyzed.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907
01410/PPMET.WK1

Table IX
Summary of pH Values in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.	Date Sampled	Lab Sample No.	pH (s.u.)
SB4-9-3.5-4	11/4/92	E228741	6.2
SB4-9-7-7.5	11/4/92	E228742	6.4
SBR-18-1.5-2	11/4/92	E228737	5.6
SBR-18-4.5-5	11/4/92	E228738	5.0
SBR-18-7.5-8	11/4/92	E228739	5.8
SBBG-0.5-1	11/4/92	E228727	5.4
SBBG-3-4	11/4/92	E228728	4.9
SBBG-5-6	11/4/92	E228730	4.7
SB3-5-1.5-2	11/4/92	E228730	8.3
SB3-5-4.5-6	11/4/92	E228732	6.8
SB3-5-7.5-8	11/4/92	E228733	6.0
SB3-5-1.5-2	11/4/92	E228734	8.6
SB3-6-3.5-4	11/4/92	E228735	5.8
SB3-6-7.5-8	11/4/92	E228736	7.2
SB4-9-1-1.5	11/4/92	E228740	10
SB3-7-0.5-1	11/5/92	E228850	9.3
SB3-7-4-5	11/5/92	E228851	8.2
SB3-8-1-2	11/5/92	E228853	12
SB3-8-4.5-5	11/5/92	E228854	5.1
SB3-8-7.5-8	11/5/92	E228855	5.4
SB4-11-3-4	11/5/92	E228857	6
SB4-11-5-6	11/5/92	E228858	6
SB4-10-3-4	11/5/92	E228860	6.4
SB4-10-5-6	11/5/92	E228861	7.3
SB4-12-0.5-2	11/5/92	E228862	6.4
SB4-12-4-5.5	11/5/92	E228863	6.6
SB2-4-4-5	11/5/92	E228866	7.9
SB2-4-7-7.5	11/5/92	E228867	7.8
SB2-3-0.5-2	11/5/92	E228868	11
SB2-3-5-6	11/5/92	E228869	7.8
SB2-3-7-8	11/5/92	E228870	11
SB1-1-4.5-5	11/6/92	E229023	6.3
SB1-2-3-4	11/6/92	E229015	11.0
SB2-5-0.5-1.5	11/6/92	E229017	6.8
SB2-5-3-4	11/6/92	E229018	6.5
SB2-5-5-6	11/6/92	E229019	6.5
SBR-13-0.5-1	11/6/92	E228991	7.0
SBR-17-0.5-1	11/6/92	E228996	10
SBR-17-4-5	11/6/92	E228997	6.3
SBR-17-7-8	11/6/92	E228998	5.4
SBR-19-0.5-1.5	11/6/92	E229005	11
SBR-19-2-3	11/6/92	E229006	7.2
SBR-19-5-6	11/6/92	E229007	6.0
SBR-20-5-6	11/6/92	E229010	6.3
SBR-21-3-4	11/6/92	E229012	6.2
SBR-13-3-4	11/6/92	E228990	7.9
SBR-13-7-8	11/6/92	E228992	6.8
SBR-14-0.5-1	11/6/92	E228993	5.6
SBR-14-4-5	11/6/92	E228994	5.2
SBR-14-7-8	11/6/92	E228995	4.3
SBR-15-0.5-1.5	11/6/92	E228999	6.9

pH = measured at Accutest Laboratories.
(--) = indicates not applicable.
bgs = below ground surface.
SBR4-9-3.5-4 = soil boring No. 9 located in AEC 4; collected at 3.5-4 feet bgs.
s.u. = standard units.

DRAI Job No. 92C907
01410/LABSBAPE.WK1

Table IX (Cont'd)
Summary of pH Values in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.	Date Sampled	Lab Sample No.	pH (s.u.)
SBR-15-3-4	11/6/92	E229001	6.9
SBR-15-5-6	11/6/92	E229000	6.9
SBR-16-0.5-1.5	11/6/92	E229002	10.0
SBR-16-4-5	11/6/92	E229003	5.7
SBR-16-7-8	11/6/92	E229004	5.0
Field Blank	11/4/92	E228726	7.0
Field Blank	11/5/92	E228849	7.1
Field Blank	11/6/92	E228889	7.0
Field Blank	11/9/92	E229041	7.3
SB5-1-0.5-1	11/9/92	E229042	8.8
SB5-1-2-2.5	11/9/92	E229043	8.6
SB5-1-5.5-6	11/9/92	E229044	11.5
SB5-2-0.5-1	11/9/92	E229045	9.3
SB5-2-1.5-2	11/9/92	E229046	7.7
SB5-2-5-5.5	11/9/92	E229047	7.6
SB5-3-3.5-4	11/9/92	E229048	7.6
SB5-3-5-6	11/9/92	E229049	7.6

pH = measured at Accutest Laboratories.
(--) = indicates not applicable.
bgs = below ground surface.
SBR4-9-3.5-4 = soil boring No. 9 located in AEC 4;
collected at 3.5-4 feet bgs.
s.u. = standard units.

DRAI Job No. 92C907
[illegible]

Table X
Summary of Base Neutral Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB1-1		SB1-1		SB2-3		SB2-4		SB3-5		SB3-7		SB4-10		SB4-11		SB5-3	
Depth (ft below surface):	1-1.5		4.5-5.0		0.5-2		0.5-2		4.5-6.0		7.5-8		1-1.5		1-2		3.5-4	
Lab Sample No. :	E229021		E229023		E228868		E228865		E228732		E228852		228859		E228856		E229048	
Date Sampled:	11/6/92		11/6/92		11/5/92		11/5/92		11/6/92		11/5/92		11/5/92		11/5/92		11/9/92	
Laboratory:	Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest	
Targeted BNs (ppb)																		
Acenaphthene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Acenaphthylene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Anthracene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzidene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzo (a) anthracene	ND		ND		ND		55		ND		ND		ND		ND		ND	
Benzo (a) pyrene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzo (g,h,i) perylene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzo (b) fluoranthene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Benzo (k) fluoranthene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
bis (2-chloroethoxy) methane	ND		ND		ND		ND		ND		ND		ND		ND		ND	
bis (2-chloroethyl) ether	ND		ND		ND		ND		ND		ND		ND		ND		ND	
bis (2-chloroisopropyl) ether	ND		ND		ND		ND		ND		ND		ND		ND		ND	
bis (2-ethylhexyl) phthalate	ND		ND		99	J	ND		ND		ND		ND		ND		ND	
4-Bromophenyl phenyl ether	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Butylbenzyl phthalate	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Carbazole	ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Chloronaphthalene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Chlorophenyl phenyl ether	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Chrysene	ND		ND		ND		74	J	ND		ND		ND		ND		ND	
Dibenzo (a,h) anthracene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,2-Dichlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
1,3-Dichlorobenzene	110	J	ND		ND		ND		ND		ND		ND		ND		ND	
1,4-Dichlorobenzene	130	J	ND		ND		ND		ND		ND		ND		ND		ND	
3,3-Dichlorobenzidene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Diethyl phthalate	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Dimethyl phthalate	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Di-n-Butyl phthalate	ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,4-Dinitrotoluene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,6-Dinitrotoluene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Di-n-Octyl phthalate	ND		ND		ND		ND		ND		ND		ND		ND		ND	
(Continued)																		

ND = not detected.

B = compound detected in method blank.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907

DJ-1410/BN-SOIL.WK1

Table X (Cont'd)
Summary of Base Neutral Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB1-1	SB1-1	SB2-3	SB2-4	SB3-5	SB3-7	SB4-10	SB4-11	SB5-3
Depth (ft below surface):	1-1.5	4.5-5.0	0.5-2	0.5-2	4.5-6.0	7.5-8	1-1.5	1-2	3.5-4
Lab Sample No.:	E229021	E229023	E228868	E228865	E228732	E228852	228859	E228856	E229048
Date Sampled:	11/6/92	11/6/92	11/5/92	11/5/92	11/6/92	11/5/92	11/5/92	11/5/92	11/9/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted BNs (ppb) (Continued)									
1,2-Diphenylhydrazine	ND	ND	ND	ND	ND	ND	ND	ND	ND
Fluoranthene	ND	ND	ND	150 J	ND	ND	ND	ND	ND
Fluorene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorobutadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachlorocylopentadiene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Hexachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND
Indeno (1,2,3-cd) pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Isophorone	ND	ND	ND	ND	ND	ND	ND	ND	ND
Naphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nitrobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodimethylamine	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodi-n-Propylamine	ND	ND	ND	ND	ND	ND	ND	ND	ND
N-Nitrosodiphenylamine	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND
3-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Nitroaniline	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,2-Oxybis(1-Chloropropane)	ND	ND	ND	ND	ND	ND	ND	ND	ND
Phenanthrene	ND	ND	51 J	78 J	ND	ND	ND	ND	ND
Pyrene	ND	ND	ND	110 J	ND	ND	ND	ND	ND
1,2,4-Trichlorobenzene	ND	ND	620	ND	ND	ND	ND	ND	ND
TOTAL TARGETED BNs (ppb):	240	ND	770	467	ND	ND	ND	ND	ND
TOTAL NON-TARGETED BNs(ppb)	8280	2170	880	160	550	9.35	1.28	5.24	ND
TOTAL TARGETED AND NON-TARGETED BNs (ppb):	8520	2170	1650	627	550	9.35	1.28	5.24	ND

ND = not detected.

B = compound detected in method blank.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907

92-1410/BN-SOIL.WSI

Table X (Cont'd)
Summary of Base Neutral Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB5-3	SBBG	SBE-1	SBE-2	Field Blank	Field Blank	Field Blank	Field Blank	Field Blank
Depth (ft below surface):	5-6	5.0-6.0	0.5-1	0.5-1	--	--	--	--	--
Lab Sample No.:	E229049	E228729	E229841	E229844	E228726	E228849	E228989	E229841	229840
Date Sampled:	11/9/92	11/6/92	11/17/92	11/17/92	11/4/92	11/5/92	11/6/92	11/9/92	11/17/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted BNs (ppb)									
Acenaphthene	ND	89 J	ND	ND	ND	ND	ND	ND	ND
Acenaphthylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Anthracene	ND	45 J	ND	ND	ND	ND	ND	ND	ND
Benzidene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (a) anthracene	ND	70 J	ND	ND	ND	ND	ND	ND	ND
Benzo (a) pyrene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (g,h,i) perylene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (b) fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzo (k) fluoranthene	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis (2-chloroethoxy) methane	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis (2-chloroethyl) ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis (2-chloroisopropyl) ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
bis (2-ethylhexyl) phthalate	83 J	ND	ND	ND	ND	ND	ND	ND	ND
4-Bromophenyl phenyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
Butylbenzyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbazole	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloronaphthalene	ND	ND	ND	ND	ND	ND	ND	ND	ND
4-Chlorophenyl phenyl ether	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chrysene	ND	90 J	ND	ND	ND	ND	ND	ND	ND
Dibenzo (a,h) anthracene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	80 J	ND	ND	ND	ND	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND
3,3-Dichlorobenzidene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Diethyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dimethyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Butyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,4-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
2,6-Dinitrotoluene	ND	ND	ND	ND	ND	ND	ND	ND	ND
Di-n-Octyl phthalate	ND	ND	ND	ND	ND	ND	ND	ND	ND
(Continued)									

ND = not detected.
B = compound detected in method blank.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907
DJ-1410/BN-SOIL.WK1

Table X (Cont'd)
Summary of Base Neutral Compounds in Soil
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	SB5-3		SBBG		SBE-1		SBE-2		Field Blank		Field Blank		Field Blank		Field Blank		Field Blank	
Depth (ft below surface):	5-6		5.0-6.0		0.5-1		0.5-1		--		--		--		--		--	
Lab Sample No.:	E229049		E228729		E229841		E229844		E228726		E228849		E228989		E229841		229840	
Date Sampled:	11/9/92		11/6/92		11/17/92		11/17/92		11/4/92		11/5/92		11/6/92		11/9/92		11/17/92	
Laboratory:	Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest		Accutest	
Targeted BNs (ppb) (Continued)																		
1,2-Diphenylhydrazine	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Fluoranthene	ND		250	J	ND		ND		ND		ND		ND		ND		ND	
Fluorene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachlorobutadiene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachlorocyclopentadiene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Hexachloroethane	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Indeno (1,2,3-cd) pyrene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Isophorone	ND		91	J	ND		ND		ND		ND		ND		ND		ND	
Naphthalene	ND		220	J	ND		ND		ND		ND		ND		ND		ND	
Nitrobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
N-Nitrosodimethylamine	ND		ND		ND		ND		ND		ND		ND		ND		ND	
N-Nitrosodi-n-Propylamine	ND		ND		ND		ND		ND		ND		ND		ND		ND	
N-Nitrosodiphenylamine	ND		ND		ND		ND		ND		ND		ND		ND		ND	
2-Nitroaniline	ND		ND		ND		ND		ND		ND		ND		ND		ND	
3-Nitroaniline	ND		ND		ND		ND		ND		ND		ND		ND		ND	
4-Nitroaniline	ND		ND		ND		ND		ND		ND		ND		ND		ND	
2,2-Oxybis(1-Chloropropane)	ND		ND		ND		ND		ND		ND		ND		ND		ND	
Phenanthrene	ND		380		ND		ND		ND		ND		ND		ND		ND	
Pyrene	ND		210	J	ND		ND		ND		ND		ND		ND		ND	
1,2,4-Trichlorobenzene	ND		ND		ND		ND		ND		ND		ND		ND		ND	
TOTAL TARGETED BNs (ppb):	83		1525		ND		ND		ND		ND		ND		ND		ND	
TOTAL NON-TARGETED BNs(ppb)	8180		4560		ND		ND		ND		ND		ND		ND		ND	
TOTAL TARGETED AND NON-TARGETED BNs (ppb):	8263		6085		ND		ND		ND		ND		ND		ND		ND	

ND = not detected.

B = compound detected in method blank.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907

D3-1410/BN-SOIL.WB1

Table XI
Summary of Volatile Organic Compounds in Ground Water
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	WE-2	WE-3	WE-4(A)	WE-4(B)	WCC-4	WCC-6S	PW-1	PW-2	Trip blank	Field blank	WE-2	WCC-6S	Trip blank	Field blank
Lab Sample No.:	E231076	E231072	E231075	E231077	E231073	E231074	E231070	E231071	E231068	E231069	E302959	E302958	E302956	E302957
Date Sampled:	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/2/92	12/3/92	2/4/93	2/4/93	2/4/93	2/4/93
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)														
Acetone	94	ND	13	11	ND	4.4 J	ND	ND	ND	ND	ND	54	ND	ND
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	1400	ND	ND	ND	ND	ND	ND	ND	ND	ND	890	ND	ND	ND
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	13000	ND	ND	ND	ND	ND	ND	ND	ND	ND	8200	ND	ND	ND
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	1.7 J	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	5400	ND	ND	ND	ND	ND	ND	ND	ND	ND	6000	ND	ND	ND
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,4-Dichlorobenzene	3000	ND	ND	ND	ND	ND	ND	ND	ND	ND	3800	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	3100	ND	ND	6.3	6.4	160	ND	33	ND	ND	2800	7.3	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	3300	ND	6.1	6.2	ND	27	ND	7.8	ND	ND	1600	4.4 J	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	1900	ND	ND	ND	ND	ND	ND	ND	ND	ND	1400	ND	ND	ND
Methylene Chloride	21000	ND	ND	ND	ND	ND	ND	5	ND	ND	10000	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	450 J	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Toluene	9700	ND	ND	ND	ND	ND	ND	ND	ND	ND	11000	ND	17	17
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Trichloroethylene	150 J	ND	3.7 J	ND	2.0 J	28	ND	7.4	ND	ND	ND	1.9 J	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Xylenes, Total	9300	ND	ND	ND	ND	ND	ND	ND	ND	ND	8100	ND	11	12
TOTAL TARGETED VOCs (ppb):	71344	ND	22.8	23.5	8.4	221.1	ND	53.2	ND	ND	54240	67.6	28	29
TOTAL NON-TARGETED VOCs(ppb):	1360	ND	18	18	ND	19	ND	6	ND	ND	860	12	7	ND
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	72704	ND	40.8	41.5	8.4	240.1	ND	59.2	ND	ND	55100	79.6	35	29

ND = not detected.
NA = not analyzed.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907
93-1416/vocgws.xls

Table XII
Summary of Priority Pollutant Metals and Miscellaneous Parameters in Ground Water
CPS Chemical Company
Old Bridge, New Jersey

DRAI Sample No.:	WE-2	WE-3	WE-4(A)	WE-4(B)	WCC-4	WCC-6	PW-1	PW-2	TB	FB
Lab Sample No.:	E231076	E231072	E231075	E231077	E231074	E231074	E231070	E231071	E231068	E231069
Date Sampled:	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/3/92	12/2/92	12/3/92
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Metals (ppm)										
Antimony	ND	0.006	ND	0.006	0.010	0.007	0.005	0.009	ND	ND
Arsenic	0.014	ND	ND	ND	ND	ND	ND	ND	ND	ND
Beryllium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Cadmium	ND	0.007	ND	ND	0.007	ND	ND	0.032	ND	ND
Chromium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Copper	ND	0.28	0.033	0.042	0.034	ND	ND	ND	ND	ND
Lead	ND	0.10	ND	0.007	0.018	0.005	0.004	ND	ND	ND
Mercury	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Nickel	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Selenium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Silver	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Thallium	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Zinc	0.56	1.5	0.61	0.73	0.21	0.38	0.2	0.29	0.026	0.039
Miscellaneous Parameters										
pH (standard units)	5.5	4.1	5.7	5.7	4.2	4.2	4.6	4.0	7.3	7.3
conductance, specific (umhos/cm)	780	290	400	400	260	420	250	320	4.0	1.0

ND = not detected.

B = compound detected in method blank and excluded from total.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 92C907

81416/MET1.WK1

Table XIII

Comparison of VOC Concentrations in Well WE-2 and Class II-A Criteria
CPS Chemical Company
Old Bridge, New Jersey

Compound	Concentration Well WE-2[1] 12/03/92 (ppb)	Class II-A[2] Criteria (ppb)
Benzene	1,400	1
Chlorobenzene	13,000	4
1,2-Dichlorobenzene	5,400	600
1,4-Dichlorobenzene	3,000	75
1,2-Dichloroethane	3,100	2
trans-1,2-Dichloroethene	3,300	100
Ethylbenzene	1,900	700
Methylene Chloride	21,000	2
Toluene	9,700	1,000
Trichloroethylene	150J	1
Xylene(s)	9,300	40

(1) Well WE-2 contained the highest concentrations of all compounds detected in the 12/92 sampling event.

(2) Source: N.J.A.C. 7:9-6 et seq.

Table XIV

Physical and Chemical Characteristics of the Compounds of Concern
CPS Chemical Company
Old Bridge, New Jersey

Compound	Water Solubility (1) Mg/l	Vapor Pressure (mm/Hg)	Henry's Law Constant (atm-m^3/mol)	Koc (ml/g)	Kow (ml/g)	Density (g/cm^3 @ 20°C)	Specific Density @ 20°C
Acetone	$1.0x10^6$ miscible	$2.31x10^2$	$3.67x10^{-5}$	$2.19x10^0$	$5.75x10^1$	0.7908	0.7899
Benzene	$1.75x10^3$	$9.52x10^1$	$5.59x10^{-3}$	$8.30x10^1$	$1.32x10^2$	0.8737	0.8765
Chlorobenzene	$4.66x10^2$	$1.17x10^1$	$3.72x10^{-3}$	$3.30x10^2$	$6.92x10^2$	1.1063	1.1058
1,2-Dichlorobenzene	$1.00x10^2$	$1.00x10^0$	$1.93x10^{-3}$	$1.70x10^3$	$3.98x10^3$	1.3003	1.3048
1,4-Dichlorobenzene	$7.90x10^1$	$1.18x10^0$	$2.89x10^{-3}$	$1.70x10^3$	$3.98x10^3$	1.2417	1.2475
1,2-Dichloroethane	$8.52x10^3$	$2.66x10^3$	$8.19x10^{-2}$	$5.70x10^1$	$2.40x10^1$	1.2600	1.2351
trans-1,2-Dichloroethene	$6.30x10^3$	$3.21x10^2$	$6.56x10^{-3}$	$5.90x10^1$	$3.02x10^0$	1.2546	1.2565
Ethylbenzene	$1.52x10^2$	$7.00x10^0$	$6.43x10^{-3}$	$1.10x10^3$	$1.41x10^3$	0.8670	0.8670
Methylene Chloride	$2.00x10^4$	$3.62x10^2$	$2.03x10^{-3}$	$8.80x10^0$	$2.00x10^1$	1.3348	1.3266
Toluene	$5.35x10^2$	$2.81x10^{12}$	$6.37x10^{-3}$	$3.00x10^2$	$5.37x10^2$	0.8623	0.8669
Trichloroethylene	$1.10x10^3$	$5.79x10^1$	$9.10x10^{-3}$	$1.26x10^2$	$2.40x10^2$	1.4679	1.4642
m-Xylene	$1.30x10^2$	$1.00x10^1$	$1.07x10^{-2}$	$9.82x10^2$	$1.82x10^3$	0.8802	0.8642
o-Xylene	$1.75x10^2$	$6.60x10^0$	$5.10x10^{-3}$	$8.30x10^2$	$8.91x10^2$	0.8642	0.8802
p-Xylene	$1.98x10^2$	$1.00x10^1$	$7.05x10^{-3}$	$8.70x10^2$	$1.41x10^3$	0.8611	0.8811

(1) All values given for 25°C.

(2)	Mg/l	= Milligrams per liter or ppm, 1.0 ppm = 1,000 ppb
	mm/Hg	= Millimeters of mercury
	atm-m^3/mol	= Atmospheres-cubic meters per mole
	ml/g	= Milliliters per gram
	g/cm^3	= Grams per cubic centimeter

Table XV

Comparison of VOC Concentrations in Soil to NJDEPE Soil Cleanup Criteria
CPS Chemical Company
Old Bridge, New Jersey

Compound	Highest Concentration(1) Detected (ppm)	Residential-Direct Contact Criteria (ppm)	Non-Residential Direct Contact Criteria (ppm)	Impact to Ground Water Criteria (ppm)
Acetone	45	1,000	1,000	50
1,2-Dichlorobenzene	20	5,100	10,000	50
Chlorobenzene	6.6[4](2)	37	680	1
Ethylbenzene	11	1,000	1,000	100
Xylene(s)	58 [2]	410	1,000	10

(1) Highest value out of a total of 101 soil samples collected and analyzed.

(2) [ ] = number of samples exceeding impact to ground water standard; no direct contact standards were exceeded.

(3) 1.0 ppm = 1,000 ppb

(4) Source: NJDEPE Proposed N.J.A.C. 7:26D, as revised 3/8/93.

Table XVI

Target Soil Contamination Levels for Inhalation Exposure[1]
CPS Chemical Company
Old Bridge, New Jersey

Compound	Residential (ppm)	Non-Residential (ppm)
Chlorobenzene	242,085[2] - 322,780[3]	359,497 - 479,329
1,2-Dichlorobenzene	66,756 - 89,008	99,132 - 132,177
Xylene	22,107 - 29,476	32,829 - 43,772

Notes: (1) Source: NJDEPE Determination of Target Soil Contamination Levels for Inhalation Exposure, Basis and Background Document for Cleanup Standards for Contaminated Sites, Draft, 4/30/91.
(2) Soil Type = sand; site size = 100m x 100m
(3) Soil Type = sand; site size = 10m x 10m

Table XVII

Subchronic and Chronic Toxicity Values for Selected Compounds
CPS Chemical Company
Old Bridge, New Jersey

Compound	Inhalation RfC (ug/ms)		Oral RfD (mg/kg/day)	
	Subchronic	Chronic	Subchronic	Chronic
Acetone	ND (4)	ND	1x10	$1x10^{-1}$
Benzene	(3)			
Chlorobenzene(5)	$2x10^{-1}$	$2x10^{-2}$	$2x10^{-1}$	$2x10^{-2}$
1,2-Dichlorobenzene	2x10	$2x10^{-1}$	$9x10^{-1}$	$9x10^{-2}$
1,4-Dichlorobenzene	$7x10^{-1}$	$7x10^{-1}$	ND	ND
1,2-Dichloroethane	(3)			
trans-1,2-Dichloroethene	ND	ND	$2x10^{-1}$	$2x10^{-2}$
Ethylbenzene	1x10	1x10	1x10	$1x10^{-1}$
Methylene Chloride	(3)			
Toluene	2x10	2x10	2x10	$2x10^{-1}$
Trichloroethylene	(3)			
Xylene(s) (6)	$3x10^{-1}$	$3x10^{-1}$	4x10	2x10

(1) Source: Health Effects Assessment Summary Tables, USEPA, Annual FY-1991.

(3) See Table XVI for carcinogenicity data for these compounds.

(4) ND = not determined.

(5) NJDEPE currently uses a chronic oral RfD of $6.5x10^{-4}$ mg/kg/day.

(6) NJDEPE currently uses a chronic oral RfD of $7.3x10^{-3}$ mg/kg/day.

Table XVII

Subchronic and Chronic Toxicity Values for Selected Compounds
CPS Chemical Company
Old Bridge, New Jersey

Compound	Inhalation RfC (ug/m3)		Oral RfD (mg/kg/day)	
	Subchronic	Chronic	Subchronic	Chronic
Acetone	ND (4)	ND	$1x10^{1}$	$1x10^{-1}$
Benzene	(3)			
Chlorobenzene(5)	$2x10^{-1}$	$2x10^{-2}$	$2x10^{-1}$	$2x10^{-2}$
1,2-Dichlorobenzene	$2x10^{1}$	$2x10^{-1}$	$9x10^{-1}$	$9x10^{-2}$
1,4-Dichlorobenzene	$7x10^{-1}$	$7x10^{-1}$	ND	ND
1,2-Dichloroethane	(3)			
trans-1,2-Dichloroethene	ND	ND	$2x10^{-1}$	$2x10^{-2}$
Ethylbenzene	$1x10^{1}$	$1x10^{1}$	$1x10^{1}$	$1x10^{-1}$
Methylene Chloride	(3)			
Toluene	$2x10^{1}$	$2x10^{1}$	$2x10^{1}$	$2x10^{-1}$
Trichloroethylene	(3)			
Xylene(s) (6)	$3x10^{-1}$	$3x10^{-1}$	$4x10^{1}$	$2x10^{1}$

(1) Source: Health Effects Assessment Summary Tables, USEPA, Annual FY-1991.

(3) See Table XVI for carcinogenicity data for these compounds.

(4) ND = not determined.

(5) NJDEPE currently uses a chronic oral RfD of $6.5x10^{-4}$ mg/kg/day.

(6) NJDEPE currently uses a chronic oral RfD of $7.3x10^{-3}$ mg/kg/day.

Table XVIII

Carcinogenicity Values for Selected Compounds
CPS Chemical Company
Old Bridge, New Jersey

Compound	Inhalation EPA Group[1]/Unit Risk[2] $(ug/m^3)^{-1}$ Slope Factor[3] $(mg/kg/day)^{-1}$	Oral EPA Group/Unit Risk $(ug/l)^{-1}$ Slope Factor $(mg/kg/day)^{-1}$
Acetone	NA	NA
Benzene	A/$8.3x10^{-6}$ $2.9x10^{-2}$	A/$8.3x10^{-7}$ $2.9x10^{-2}$
Chlorobenzene	NA	NA
1,2-Dichlorobenzene	NA	NA
1,4-Dichlorobenzene	C/ND	C/$6.8x10^{-7}$ $2.4x10^{-2}$
1,2-Dichloroethane	B2/$2.6x10^{-5}$ $9.1x10^{-2}$	B2/$2.6x10^{-6}$ $9.1x10^{-2}$
trans-1,2-Dichloroethene	NA	NA
Ethylbenzene	NA	NA
Methylene Chloride	B2/$4.7x10^{-7}$	B2/$2.1x10^{-7}$
Toluene	NA	NA
Trichloroethylene	B2/$1.7x10^{-6}$ $1.7x10^{-2}$	B2/$3.2x10^{-7}$ $1.1x10^{-2}$
Xylene(s)	NA	NA

Footnotes: (1) EPA Group: A - Human Carcinogen
B - Probable Human Carcinogen
B1 - limited evidence of carcinogenicity in humans
B2 - sufficient evidence of carcinogenicity in animals; inadequate or lack of evidence in humans
C - Possible Human Carcinogen
D - Not Classified as to Human Carcinogenicity (inadequate or no evidence)
E - Evidence of Noncarcinogenicity for Humans
(2) Unit Risk = risk associated with a unit concentration in air or water
(3) Slope Factor = risk per unit dose
(4) NA = not available in HEAST Tables
(5) ND = not determined
(6) Source: Health Effects Assessment Summary Tables, USEPA, Annual FY-1991

PHASE II DATA

TABLES

Table I
Results of Effluent Sampling at Well WE-2R
CPS Chemical Company – Old Bridge, New Jersey

	Initial Conditions	Begin Pumping				Analytical Comparison			Analytical Comparison		
DRAI Sample No.:	WE-2R	WE-2R	WE-2R	WE-2R	WE-2R	WE-2R	WE-2R	WE-2R	WE-2R	WE-2R	Class II-A Criteria (ppb)
Lab Sample No.:	E404837	E405212				E407552			E407552		
Date Sampled:	03/02/94	03/07/94	3/09/94	03/16/94	03/23/94	03/25/94	03/25/94	04/06/94	04/15/94	04/15/94	
Laboratory:	Accutest	Accutest	CPS	CPS	CPS	Accutest	CPS	CPS	Accutest	CPS	
Targeted VOCs (ppb)											
Acetone	10000	2800	ND	ND	ND	4800	ND	ND	ND	ND	700
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Benzene	960	550	1205	735	615	600	515	460	540	415	1
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
2-Butanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Carbon Disulfide	ND	ND	ND	ND	ND	240	ND	ND	ND	ND	--
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Chlorobenzene	4400	3200	6040	6055	5260	2900	4695	4250	4600	4095	4
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
1,2-Dichlorobenzene	1830	1280	4414	2785	2585	2600	2205	1960	2200	1890	600
1,3-Dichlorobenzene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
1,4-Dichlorobenzene	ND	ND	3045	2540	2300	ND	2015	1640	ND	1475	75
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
1,2-Dichloroethane	2400	1300	1050	695	190	ND	275	1105	900	1125	2
1,2-Dichloroethene (Total)	1400	620	ND	ND	ND	430	ND	ND	ND	ND	10
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
trans-1,2-Dichloroethylene	ND	ND	10	99	22	ND	30	60	ND	320	100
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Ethylbenzene	760	490	1070	870	540	610	440	385	610	340	700
2-Hexanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
4-Methyl-2-Pentanone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Methylene Chloride	10000	3900	12250	4350	6520	5200	4535	4655	6700	220	2
Styrene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
1,1,2,2-Tetrachloroethane	340	200	ND	ND	ND	ND	ND	ND	210	ND	2
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Toluene	8700	5200	9760	8860	7570	9500	6185	5050	9300	4225	1000
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
1,1,2-Trichloroethane	300	180	ND	ND	ND	ND	ND	ND	ND	ND	3
Trichloroethylene	910	110	234	110	105	ND	90	75	ND	75	1
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Vinyl Acetate	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	--
Vinyl Chloride	ND	95	ND	ND	ND	ND	ND	ND	ND	ND	--
Xylenes, Total	3800	2400	1970	2630	1650	4900	1370	1930	3100	1730	40
TOTAL TARGETED VOCs (ppb):	45820	22325	41048	29729	27357	31980	22355	21570	28160	15910	
TOTAL NON-TARGETED VOCs(ppb):	3910	5390	NA	NA	NA	630	NA	NA	1690	NA	
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	49730	27715	41048	29729	27357	32610	22355	21570	29850	15910	

ND = not detected.

NA = not analyzed.

B = compound detected in method blank and excluded from total.

J = estimated concentration detected below the Method Detection Limit.

Ground water samples analyzed by Accutest were collected directly from well WE-2R; ground water samples analyzed by CPS were collected from a sample port located at end of the WE-2R effluent discharge lin

DRAI Job No. 91C987

83-1410/VOCs-2r.WK1

Table II
Summary of Soil Boring/Hydropunch Installation

Sample Location	Total Depth (ft)	Sampling Depth Interval (ft)									
		Unsaturated Zone			Saturated Zone						
		0–2'	2–4'	4–6'	6–8'	10–15'	20–25'	30–35'	40–45'	45–50'	50+
SBR–22	85		S	S		H	H	H	H		H
SB5–8	62		S	S		H	H	H			S
SB5–6	47		S			H	H	H	H	S	
SB5–7	33					H	H	H			
SB5–9	47					H	H	H	H	S	
SB5–11	32		S	S		H	H	S			
SB5–4	7			S							
CPS–1H	34	S			S	H	H				
CPS–2H	50		S				H	H		H	

H = Hydropunch Sample Collected
S = Soil Sample Collected
See Table IX for analytical results.

DRAI Job No. 92C907

D3–3654/sbhsum.wk1

Table III
Monitoring Well Construction Details and Elevations
CPS Chemical Co. – Old Bridge, New Jersey

SHALLOW WATER WELLS (Screen Elevation >20 ft–msl)

Well Name	Total Depth (ft)	Depth to Screen Interval (ft–bgs)		Elevation (ft–msl)				
		Top	Bottom	Top of Outer Casing	Top of Inner Casing	Ground Surface	Screen Interval Top	Screen Interval Bottom
CPS–1	46.00	21.00	41.00	25.94	25.60	23.20	4.60	–15.40
CPS–2	15.36	3.36	15.36	26.16	25.68	23.10	22.32	10.32
CPS–3	47.30	22.30	42.30	27.62	27.40	24.54	5.10	–14.90
CPS–3s	15.56	3.56	15.56	27.62	27.35	24.54	23.79	11.79
WE–2R	33.72	23.72	33.72	27.50	27.26	25.50	3.54	–6.46
WE–2	26.90	24.90	26.90	27.93	27.71	25.90	2.81	0.81
WE–3	26.50	24.50	26.50	25.81	25.66	23.88	1.16	–0.84
WE–4	27.25	25.25	27.25	25.27	24.86	22.72	0.02	–1.98
WCC–4s	34.05		34.05	22.82	22.84	22.76		–11.21
WCC–5s	34.54		34.54	26.13	25.97	25.16		–8.57
WCC–6s	35.72		35.72	26.12	25.80	24.18		–9.92
Stream	---	---	---	---	---	24.48	---	---

INTERMEDIATE WATER WELLS (Screen Elevation <20 and >45 ft–msl)

Well Name	Total Depth (ft)	Depth to Screen Interval (ft–bgs)		Elevation (ft–msl)				
		Top	Bottom	Top of Outer Casing	Top of Inner Casing	Ground Surface	Screen Interval Top	Screen Interval Bottom
WCC–1m	54.02	44.02	54.02	26.49	26.41	25.39	–17.61	–27.61
WCC–4m	55.50	45.50	55.50	23.56	23.28	22.84	–22.22	–32.22
WCC–6m	55.56		55.56	25.26	24.98	24.62		–30.58

DEEP WATER WELLS (Screen Elevation <45 ft–msl)

Well Name	Total Depth (ft)	Depth to Screen Interval (ft–bgs)		Elevation (ft–msl)				
		Top	Bottom	Top of Outer Casing	Top of Inner Casing	Ground Surface	Screen Interval Top	Screen Interval Bottom
WCC–1d	101.00	91.00	101.00	26.71	24.13	24.95	–64.29	–74.29
WCC–6d	80.00	70.00	80.00	26.32	25.28	24.22	–44.72	–54.72

DRAI Job No. 91C907

D3-3854/CPS-ELEV.WK1

Table IV
Summary of Water-Level Measurements and Elevations
CPS Chemical Co. - Old Bridge, New Jersey

Well Name	Top-of-Outer Casing Elevation (ft-msl)	Top-of-Inner Casing Elevation (ft-msl)	Ground Surface Elevation (ft-msl)	Measurement Date: 9/19/94		Measurement Date: 9/29/94	
				Depth to Water (ft)	Ground Water Elevation (ft-msl)	Depth to Water (ft)	Ground Water Elevation (ft-msl)
CPS-1	25.94	25.60	23.20	6.90	18.70	7.12	18.48
CPS-2	26.16	25.68	23.10	6.88	18.80	6.98	18.70
CPS-3	27.52	27.40	24.54	8.09	19.31	8.20	19.20
CPS-3s	27.62	27.35	24.54	7.96	19.39	7.94	19.41
WE-2R	27.50	27.26	25.50	8.36	18.90	8.47	18.79
WE-2	27.93	27.71	25.90	8.76	18.95	8.86	18.85
WE-3	25.81	25.66	23.88	6.22	19.44	6.36	19.30
WE-4	25.27	24.86	22.72	4.25	20.61	5.26	20.01
WCC-1m	26.49	26.41	25.39	4.10	22.31	4.17	22.24
WCC-1d	26.71	24.13	24.95	------	------	4.46	22.25
WCC-4s	22.80	22.80	22.79	2.41	20.39	2.46	20.34
WCC-4m	23.56	23.28	22.84	2.66	20.62	2.70	20.58
WCC-5s	26.13	25.97	25.16	7.08	18.89	7.21	18.76
WCC-6s	26.20	25.92	24.55	6.12	19.80	6.25	19.67
WCC-6m	25.26	24.98	24.62	5.38	19.60	5.52	19.46
WCC-6d	26.32	25.28	24.22	5.70	19.58	5.88	19.40
Stream	---	---	24.48	4.70	19.78	4.64	19.84

DRAI Job No. 91C907
D3-3854/gwe9-94.wk1

Table V
Summary of Volatile Organic Compounds in Soil

DRAI Sample No.:	SBR-22/3-4'	SBR-22/5-6'	SB5-8/3-4'	SB5-8/4-5'	SB5-6/2-4'	SB5-11/2-3'	SB5-11/4-5'	SB5-4/4-5'	CPS-1H/0-2'	CPS-1H/6-8'	CPS-2H/2-4(A)	CPS-2H/2-4(B)
Sample Depth Interval (ft):	3.0-4.0	5.0-6.0	3.0-4.0	4.0-5.0	2.0-4.0	2.0-3.0	4.0-5.0	4.0-5.0	0.0-2.0	6.0-8.0	2.0-4.0	2.0-4.0
Lab Sample No.:	E426789	E426790	E427548	E427549	E427762	E428147	E428148	E428274	E428276	E428275	E428548	E428549
Date Sampled:	8/15/94	8/15/94	8/18/94	8/18/94	8/22/94	8/24/94	8/24/94	8/24/94	8/25/94	8/25/94	8/26/94	8/26/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Acetone	ND	ND	NA	ND	4.4	ND	25	ND	NA	NA	ND	ND
Benzene	ND	11	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Bromoform	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Bromodichloromethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Bromomethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2-Butanone	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Carbon Disulfide	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Carbon Tetrachloride	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Chlorobenzene	93	1600	NA	4.6	ND	ND	380	ND	NA	NA	ND	ND
Chloroethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Chloroform	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Chloromethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
cis-1,3-Dichloropropene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Dibromochloromethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,1-Dichloroethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,2-Dichloroethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,1-Dichloroethylene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,2-Dichloroethylene (Total)	ND	ND	NA	ND	ND	15	5	ND	NA	NA	ND	ND
trans-1,3-Dichloropropene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,2-Dichloropropane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Ethylbenzene	4.1	26	NA	11	ND	42	18	ND	NA	NA	ND	ND
2-Hexanone	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
4-Methyl-2-Pentanone	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Methylene Chloride	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Styrene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	NA	ND	ND	10	ND	ND	NA	NA	ND	ND
Tetrachloroethylene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Toluene	16	330	NA	2.4	ND	18	10	ND	NA	NA	ND	ND
1,1,1-Trichloroethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,1,2-Trichloroethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Trichloroethylene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Vinyl Chloride	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Xylenes (Total)	26	150	NA	36	ND	370	110	8.2	NA	NA	ND	ND
TOTAL VOCs (ppb):	139.1	2117	0	54	4.4	455	548	8.2	0	0	0	0

NA = not analysed.
ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907
03-1991/VOCS.M01

Table VI
Summary of Acid Extractable/Base Neutral Compounds in Soil

DRAI Sample No.:	SBR-22/3-4'	SBR-22/5-6'	SB5-8/3-4'	SB5-8/4-5'	SB5-6/2-4'	SB5-11/2-3'	SB5-11/4-5'	SB5-4/4-5'	CPS-1H/0-2'	CPS-1H/6-8'	CPS-2H/2-4(A)	CPS-2H/2-4(B)
Lab Sample No.:	E426789	E426790	E427548	E427549	E427762	E428147	E428148	E248274	E428276	E428275	E428548	E428549
Date Sampled:	8/15/94	8/15/94	8/18/94	8/18/94	8/22/94	8/24/94	8/24/94	8/24/94	8/25/94	8/25/94	8/26/94	8/26/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted BNs (ppb)												
Acenaphthene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Acenaphthylene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Anthracene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Benzidene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Benzo (a) anthracene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Benzo (a) pyrene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Benzo (g,h,i) perylene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Benzo (b) fluoranthene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Benzo (k) fluoranthene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
bis (2-chloroethoxy) methane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
bis (2-chloroethyl) ether	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
bis (2-chloroisopropyl) ether	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
bis (2-ethylhexyl) phthalate	170	360	NA	390	450	830	5600	100	NA	NA	410	410
4-Bromophenyl phenyl ether	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Butylbenzyl phthalate	ND	ND	NA	ND	ND	ND	180	ND	NA	NA	ND	ND
2-Chloronaphthalene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
4-Chlorophenyl phenyl ether	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Chrysene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Dibenzo (a,h) anthracene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,2-Dichlorobenzene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,3-Dichlorobenzene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,4-Dichlorobenzene	ND	180	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
3,3-Dichlorobenzidene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Diethyl phthalate	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Dimethyl phthalate	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Di-n-Butyl phthalate	ND	ND	NA	ND	ND	ND	220	ND	NA	NA	ND	ND
2,4-Dinitrotoluene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2,6-Dinitrotoluene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Di-n-Octyl phthalate	ND	ND	NA	ND	98	270	190	ND	NA	NA	56	56
(Continued)												

ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907

Table VI (Cont'd)
Summary of Acid Extractable/Base Neutral Compounds in Soil

DRAI Sample No.:	SBR-22/3-4'	SBR-22/5-6'	SB5-8/3-4'	SB5-8/4-5'	SB5-6/2-4'	SB5-11/2-3'	SB5-11/4-5'	SB5-4/4-5'	CPS-1H/0-2'	CPS-1H/6-8'	CPS-2H/2-4(A)	CPS-2H/2-4(B)
Lab Sample No.:	E426789	E426790	E427548	E427549	E427762	E428147	E428148	E248274	E428276	E428275	E428548	E428549
Date Sampled:	8/15/94	8/15/94	8/18/94	8/18/94	8/22/94	8/24/94	8/24/94	8/24/94	8/25/94	8/25/94	8/26/94	8/26/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted BNs (ppb)												
(Continued)												
1,2-Diphenylhydrazine	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Fluoranthene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Fluorene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Hexachlorobenzene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Hexachlorobutadiene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Hexachlorocyclopentadiene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Hexachloroethane	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Indeno (1,2,3-cd) pyrene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Isophorone	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Naphthalene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Nitrobenzene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
N-Nitrosodimethylamine	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
N-Nitrosodi-n-Propylamine	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
N-Nitrosodiphenylamine	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Phenanthrene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Pyrene	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
1,2,4-Trichlorobenzene	ND	ND	NA	1500	ND	320	11000	ND	NA	NA	ND	ND
Targeted AEs (ppb)												
2-Chlorophenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2,4-Dichlorophenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2,4-Dimethylphenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
4-chloro-3-methyl phenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2,4-Dinitrophenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2-Nitrophenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
4-Nitrophenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2-Methyl-4,6-Dimethylphenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Pentachlorophenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
Phenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
2,4,6-Trichlorophenol	ND	ND	NA	ND	ND	ND	ND	ND	NA	NA	ND	ND
TOTAL TARGETED BNs (ppb):	170	540		1890	548	1420	17190	100			486	486
TOTAL TARGETED AEs (ppb):	0	0		0	0	0	0	0			0	0
TOTAL NON-TARGETED BNs AND AEs (ppb):	170	540		1890	548	1420	17190	100			486	486

ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907
A7034/SUMBSOIL.XLS

Table VII
Summary of TAL Metals in Soil

DRAI Sample No.:	SBR-22/3-4'	SBR-22/5-6'	SBR5-8/3-4'	SBR5-8/4-5'	SB5-6/2-4'	SB5-11/2-3'	SB5-11/4-5'	SB5-4/4-5'	CPS-1H/0-2'	CPS-1H/6-8'	CPS-2H/2-4(A)	CPS-2H/2-4(B)
Lab Sample No.:	E426789	E426790	E427548	E427549	E427762	E428147	E428148	E428274	E428276	E428275	E428548	E428549
Date Sampled:	8/15/94	8/15/94	8/18/94	8/18/94	8/22/94	8/24/94	8/24/94	8/24/94	8/25/94	8/25/94	8/26/94	8/26/94
Laboratory:	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST	ACCUTEST
Metals (ppb)												
Aluminum	3700	2100	7700	5300	5600	8800	4400	3400	4800	2400	1800	1900
Antimony	<6.9	<7.0	<6.3	<6.5	<7.1	<6.5	<6.7	<7.3	<6.5	<7.1	<6.6	<7.1
Arsenic	2	<1.2	2.8	2	<1.2	1.9	<1.1	<1.2	4.6	<1.2	7.2	2.5
Barium	<23	<23	<21	<22	<24	<22	<22	<24	<22	<24	<22	<24
Beryllium	<0.57	<0.58	<0.53	<0.54	<0.59	<0.54	<0.56	<0.61	<0.54	<0.59	<0.55	<0.59
Cadmium	<0.57	<0.58	<0.53	<0.54	<0.59	1	1.2	<0.61	<0.54	<0.59	<0.55	<0.59
Calcium	890	<580	4900	1900	15000	15000	6800	1800	<540	<590	<550	<590
Chromium	11	15	14	16	9.1	16	8.8	8.1	16	5.3	38	9.9
Cobalt	<5.7	<5.8	<5.3	<5.4	<5.9	6.5	<5.6	<6.1	<5.4	<5.9	<5.5	<5.9
Copper	3	3.4	50	32	16	160	43	5.8	12	<2.9	23	34
Iron	8300	2800	15000	9900	24000	16000	6900	2600	22000	4900	3900	2300
Lead	<11	<12	13	15	<12	46	20	<12	16	<12	<11	<12
Magnesium	<570	<580	2600	980	2400	3800	1600	<610	<540	<590	<550	<590
Manganese	14	6	80	45	93	130	57	30	31	12	19	36
Mercury	<0.11	<0.10	<0.091	<0.11	<0.10	<0.096	<0.095	0.1	<0.11	<0.12	<0.10	<0.11
Nickel	<4.6	<4.7	9.5	4.4	7	13	5.4	<4.9	<4.3	<4.7	<4.4	<4.7
Potassium	<570	<580	<530	<540	<590	<540	<560	<610	<540	<590	<550	650
Selenium	<11	<12	<11	<11	<12	<11	<11	<12	<11	<12	<11	<12
Silver	<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.2	<1.1	<1.2
Sodium	<570	<580	<530	<540	<590	<540	<560	<610	<540	<590	<550	<590
Thallium	<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.1	<1.2	<1.1	<1.2	<1.1	<1.2
Vanadium	20	17	36	26	19	35	17	7.9	27	11	33	21
Zinc	24	6.6	160	140	16	880	310	17	48	23	44	39
Miscellaneous Parameters												
Cyanide, Total	<1.0	<1.0		<1.0	<1.0	<1.0	<1.0	<1.0			<1.0	<1.0
Total Percent Solids	87	86	95	92	85	92	89	82	92	85	91	85

ND = not detected.

B = compound detected in method blank and excluded from total.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907

Table VIII
Summary of TOC Results in Soil
CPS Chemical Co. – Old Bridge, New Jersey

Sample No.	Sample Matrix	Total Organic Carbon (mg/kg)	Soil Bulk Density (g/ml)
SBR–22/3–4	Soil	6,100	
SB5–6/46–47	Soil	<1,000	1.70
SB5–8/20–24	Soil	<5,900	
CPS–1H/6–8	Soil	<1,000	2.00
SB5–4/4–5	Soil	9,800	
CPS–2H/25–27	Soil	<1,000	
CPS–2H/35–37	Soil	5,000	
	Average:	3,620	1.85

DRAI Job No. 94C1388

D3-3854/TOC-2.WK1

Table IX
Summary of Volatile Organic Compounds in Hydropunch Samples

Sample Depth Interval: 10 to 15 feet

DRAI Sample No.:	SBR-22/10-14'	SB5-8/10-14'	SB5-6/10-14'	SB5-7/10-13'	SB5-9/10-13'	SB5-11/10-15'	CPS-1H/10-14'	
Lab Sample No.:	E426786	E427544	E427757	E427825	E428139	E428144	E428277	
Sample Matrix:	Water	Water	Water	Water	Water	Water	Water	
Date Sampled:	8/15/94	8/18/94	8/22/94	8/23/94	8/23/94	8/24/94	8/25/94	
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	
Targeted VOCs (ppb)								
Acetone	4,900	ND	ND	ND	ND	ND	ND	
Benzene	770	3,100	240	29	6,200	ND	ND	
Chlorobenzene	980	380	3,900	890	ND	ND	ND	
1,2-Dichlorobenzene	1,600	50	2,600	34	10,000	ND	ND	
1,4-Dichlorobenzene	470	14	800	15	ND	ND	ND	
1,2-Dichloroethane	3,100	ND	950	ND	15,000	ND	ND	
1,2-Dichloroethene (total)	940	14,000	ND	ND	ND	ND	ND	
Ethylbenzene	450	3,600	910	47	1,500	ND	ND	
Methylene Chloride	18,000	6,100	760	ND	1,000,000	2.1	ND	
Toluene	9,100	62,000	12,000	ND	46,000	ND	ND	
Trichloroethylene	360	590	ND	ND	ND	ND	ND	
Xylene, (Total)	1,100	13,000	6,400	35	9,900	ND	ND	
TOTAL TARGETED VOCs (ppb):	41,770	102,834	28,560	1,050	1,088,600	2.1	0	

Sample Depth Interval: 20 to 25 feet

DRAI Sample No.:	SBR-22/20-24'	SB5-8/20-24'	SB5-6/20-24'	SB5-7/20-22'	SB5-9/20-23'	SB5-11/20-25'	CPS-1H/20-24'	CPS-2H/20-25'
Lab Sample No.:	E426787	E427545	E427758	E427826	E428140	E428145	E428278	E428545
Sample Matrix:	Water	Water	Water	Water	Water	Water	Water	Water
Date Sampled:	8/15/94	8/18/94	8/22/94	8/23/94	8/23/94	8/24/94	8/25/94	8/26/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)								
Acetone	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	240	3,000	130	3.6	ND	ND	ND	110
Chlorobenzene	3,000	350	1,600	7.6	ND	ND	ND	ND
1,2-Dichlorobenzene	190	ND	1,100	2.9	2,900	ND	ND	390
1,4-Dichlorobenzene	62	ND	610	1.9	ND	ND	ND	65
1,2-Dichloroethane	240	640	500	ND	55	ND	ND	230
1,2-Dichloroethene (total)	68	14,000	ND	ND	ND	ND	ND	430
Ethylbenzene	110	3,100	410	ND	ND	ND	ND	74
Methylene Chloride	2,100	6,200	9,000	ND	2,400	ND	ND	1,600
Toluene	1,400	71,000	5,400	ND	250	ND	ND	1,800
Trichloroethylene	64	580	ND	ND	ND	ND	ND	ND
Xylene, (Total)	290	11,000	2,600	3.5	170	ND	ND	350
TOTAL TARGETED VOCs (ppb):	7,764	109,870	21,350	20	5,775	0	0	5,049

ND = not detected.

B = compound detected in method blank and excluded from total.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907

D3-3954/VOChp.WR1

Table IX (cont'd)
Summary of Volatile Organic Compounds in Hydropunch Samples

Sample Depth Interval: 30 to 35 feet

DRAI Sample No.:	SBR-22/30-34'	SB5-8/30-34'	SB5-6/30-32'	SB5-7/30-33'	SB5-9/30-33'	SB5-11/31-32'	CPS-2H/30-35'
Lab Sample No.:	E426788	E427546	E427759	E427827	E428141	E428146	E428546
Sample Matrix:	Water	Water	Water	Water	Water	Soil	Water
Date Sampled:	8/15/94	8/18/94	8/22/94	8/23/94	8/23/94	8/24/94	8/26/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)							
Acetone	ND	ND	ND	ND	ND	ND	ND
Benzene	2.1	ND	ND	ND	29	ND	140
Chlorobenzene	36	ND	170	ND	ND	ND	2,000
1,2-Dichlorobenzene	110	290	210	ND	110	ND	300
1,4-Dichlorobenzene	34	28	ND	ND	ND	ND	380
1,2-Dichloroethane	ND	170	90	ND	59	ND	ND
1,2-Dichloroethene (total)	4.8	100	ND	ND	ND	ND	54
Ethylbenzene	4.5	ND	ND	ND	ND	ND	57
Methylene Chloride	ND	560	2900	ND	2,800	ND	ND
Toluene	ND	170	770	ND	220	ND	ND
Trichloroethylene	ND	ND	ND	ND	ND	ND	ND
Xylene, (Total)	3.9	81	310	ND	64	ND	140
TOTAL TARGETED VOCs (ppb):	195.3	1,399	4,450	0	3,282	0	3,071

Sample Depth Interval: 40 to 45 feet

DRAI Sample No.:	SBR-22/40-45'	SB5-6/40-43'	SB5-9/40-43'
Lab Sample No.:	E427118	E427760	E428142
Sample Matrix:	Water	Water	Water
Date Sampled:	8/17/94	8/22/94	8/23/94
Laboratory:	Accutest	Accutest	Accutest
Targeted VOCs (ppb)			
Acetone	1,000	ND	ND
Benzene	32	ND	89
Chlorobenzene	190	ND	ND
1,2-Dichlorobenzene	160	62	280
1,4-Dichlorobenzene	44	11	ND
1,2-Dichloroethane	320	11	220
1,2-Dichloroethene (total)	ND	ND	22
Ethylbenzene	22	8	ND
Methylene Chloride	1,100	310	11,000
Toluene	250	120	680
Trichloroethylene	ND	ND	ND
Xylene, (Total)	130	54	200
TOTAL TARGETED VOCs (ppb):	3,248	576	12,491

ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907
D3-3854/VOChp.WK1

Table IX (cont'd)
Summary of Volatile Organic Compounds in Hydropunch Samples

	Sample Depth Interval: 45 to 50 feet							
DRAI Sample No.:			SB5-6/46-47'		SB5-9/45-47'			CPS-2H/45-50'
Lab Sample No.:			E427761		E428143			E428547
Sample Matrix:			Soil		Soil			Water
Date Sampled:			8/22/94		8/23/94			8/26/94
Laboratory:			Accutest		Accutest			Accutest
Targeted VOCs (ppb)								
Acetone			ND		ND			ND
Benzene			ND		ND			ND
Chlorobenzene			ND		ND			ND
1,2-Dichlorobenzene			3.3		ND			1,100
1,4-Dichlorobenzene			ND		ND			28
1,2-Dichloroethane			ND		ND			ND
1,2-Dichloroethene (total)			ND		ND			ND
Ethylbenzene			ND		ND			ND
Methylene Chloride			4.4		ND			ND
Toluene			ND		ND			ND
Trichloroethylene			ND		ND			8.7
Xylene, (Total)			ND		ND			22
TOTAL TARGETED VOCs (ppb):			7.7		0			1,158.7

	Sample Depth Interval: 50 and greater feet							
DRAI Sample No.:	SBR-22/55-60'	SB5-8/61.5-62'						
Lab Sample No.:	E427119	E427550						
Sample Matrix:	Water	Soil						
Date Sampled:	8/17/94	8/19/94						
Laboratory:	Accutest	Accutest						
Targeted VOCs (ppb)								
Acetone	260	270						
Benzene	3.8	ND						
Chlorobenzene	26	ND						
1,2-Dichlorobenzene	61	5.3						
1,4-Dichlorobenzene	12	ND						
1,2-Dichloroethane	52	ND						
1,2-Dichloroethene (total)	ND	ND						
Ethylbenzene	2.1	ND						
Methylene Chloride	140	ND						
Toluene	24	ND						
Trichloroethylene	8.0	ND						
Xylene, (Total)	13	ND						
TOTAL TARGETED VOCs (ppb):	601.9	275.3						

ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907
D3-3054/VOChp.WK1

Table X
Summary of Well Purging Information and Field Parameter Results

DATE: 09/19/94

Well No. or Name	Time	Total Depth (ft)	Depth To Water (ft)	Water Column (ft)	Multi-plier	Est. Purge Vol. (gal)	PID (ppm)	Depth to Prod. (ft)	Prod. Thick. (ft)	Temp (°C)	pH (su)	Field Cond (umhos/cm)	D.O. (ppm)
PRE-PURGE INFORMATION										PRE-PURGE			
WCC-4S	925	34.05	2.41	31.64	0.50	15.8	<1	ND	ND	23.0	4.00	323	4.7
WCC-1M	940	54.02	4.10	49.92	0.50	25.0	<1	ND	ND	19.4	3.91	450	5.1
CPS-2	1050	15.36	6.88	8.48	0.50	4.2	<1	ND	ND	23.7	3.44	418	5.2
CPS-1	1055	46.00	6.90	39.10	1.95	76.2	2	ND	ND	18.6	4.28	485	5.2
CPS-3	1010	47.30	8.09	39.21	1.95	76.5	20	ND	ND	20.9	5.90	481	4.9
WCC-6S	955	35.72	6.12	29.60	0.50	14.8	<1	ND	ND	23.9	4.62	344	6.6
WE-4	1045	26.55	4.25	22.30	0.50	11.2	<1	ND	ND	23.4	7.57	766	10.1
WE-3	1035	26.30	6.22	20.08	0.50	10.0	<1	ND	ND	19.8	4.12	320	9.5
WCC-5S	1025	34.54	7.08	27.46	0.50	13.7	<1	ND	ND	19.8	4.22	278	5.2
WE-2R	1015	33.72	8.36	25.36	1.95	49.5	<1	ND	ND	17.9	5.75	825	5.4

Well No. or Name	Pump Type	Time Pump On	Time Pump Off	Flow Rate per Volume (gpm) 1st & 2nd	3rd	Total Purge Vol. (gal)	Water Conditions	Temp (°C)	pH (su)	Field Cond (umhos/cm)	D.O. (ppm)
PURGING INFORMATION								POST-PURGE			
WCC-4S	Sub	932	940	2	2	16	Clear, no odor	17.6	3.87	365	4.8
WCC-1M	Sub	955	1008	2	2	26	Clear, no odor	16.1	3.87	457	6.0
CPS-2	Sub	1056	1101	2	2	5	Sandy, slight odor	22.8	3.54	463	5.0
CPS-1	Sub	1113	1124	5	5	77	Cloudy, strong odor	17.4	3.40	344	4.2
CPS-3	Sub	1215	1231	5	5	80	Slighty cloudy, very strong odor	17.9	5.88	630	5.0
WCC-6S	Sub	1244	1252	2	2	16	Slighty cloudy, no odor	18.1	4.73	382	5.0
WE-4	Jet	1345	1356	2	2	12	Slighty cloudy, no odor	18.9	4.34	300	7.8
WE-3	Jet	1409	1419	2	2	10	Clear, no odor	17.6	4.49	356	5.8
WCC-5S	Sub	1431	1438	2	2	14	Clear, no odor	15.8	4.36	268	4.9
WE-2R	Sub	1430	1441	5	5	55	Foamy, very strong odor	--	--	--	--

Well No. or Name	80% Recov. (ft)	Depth To Water (ft)	Sample Time	Comments	Temp (°C)	pH (su)	Field Cond (umhos/cm)	D.O. (ppm)
SAMPLING INFORMATION					POST-SAMPLE			
WCC-4S	8.74	2.41	1140		25.0	4.73	337	5.6
WCC-1M	14.08	4.10	1210		22.0	4.24	444	5.2
CPS-2	8.58	6.87	1115		24.0	3.84	404	5.9
CPS-1	14.72	6.94	1130		19.2	3.47	330	6.1
CPS-3	15.93	8.09	1315		20.2	5.89	630	6.7
WCC-6S	12.04	6.12	1330		21.9	4.64	371	6.2
WE-4	8.71	4.25	1500		21.7	6.87	527	7.7
WE-3	10.24	6.29	1520		22.0	4.43	350	6.3
WCC-5S	12.57	7.14	1540		23.7	4.18	284	6.8
WE-2R	13.43	8.43	1600		21.9	5.83	735	7.0

Total depth includes stick-up height.
Multiplier includes a factor of 3 to calculate the required volume of ground water to be removed from the well.
80% recovery is calculated by subtracting 80% of the water column height from the total depth [Total Depth - (0.80 x Water Column)].
A & B denote field duplicates.

DRAI Job No. 91C907
D3-1410/GWSMC994.WK1

Table XI
Summary of Volatile Organic Compounds in Ground Water

DRAI Sample No.:	Trip Blank	CPS-1/PRE	CPS-1	CPS-2	CPS-3/PRE	CPS-3	WCC-1M	WCC-4S	WCC-5S	WCC-6S	WE-2R/A
Lab Sample No.:	E431266	E431267	E431270	E431268	E431274	E431277	E431275	E431272	E431285	E431279	E431288
Date Sampled:	09/19/94	09/19/94	09/19/94	09/19/94	09/19/94	09/19/94	09/19/94	09/19/94	09/19/94	09/19/94	09/19/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)											
Acetone	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrolein	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Benzene	ND	71	370	ND	230	1100	ND	ND	ND	ND	910
Bromoform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chlorobenzene	ND	770	4400	ND	400	1800	ND	ND	ND	ND	4500
Chloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichlorobenzene	ND	510	1200	ND	950	3500	ND	ND	ND	ND	2700
1,3-Dichlorobenzene	ND	270	560	ND	230	1100	ND	ND	ND	ND	290
1,4-Dichlorobenzene	ND	66	100	ND	43	180	ND	ND	ND	ND	1500
1,1-Dichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloroethane	ND	160	800	ND	250	1000	120	5.4	ND	82	1600
1,1-Dichloroethylene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND	ND	160	ND	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Ethylbenzene	ND	70	340	ND	90	370	ND	ND	ND	ND	580
Methylene Chloride	ND	2500	15000	ND	2100	3500	25	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND	ND	ND	1.2	ND	ND	1.3	ND
Toluene	ND	1000	6600	ND	720	2500	ND	ND	ND	ND	4500
1,1,1-Trichloroethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND	ND	170	ND	ND	ND	ND	ND
Trichloroethylene	ND	ND	120	ND	39	51	29	1.0	ND	21	ND
Trichlorofluoromethane	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND	ND	190	ND	ND	ND	ND	ND
Xylene (Total)	ND	150	800	ND	250	1100	ND	ND	ND	ND	1500
TOTAL TARGETED VOCs (ppb):	ND	5567	30290	ND	5302	16721	175.2	6.4	ND	104.3	18080
TOTAL NON-TARGETED VOCs (ppb):	ND	726	1820	142	3092	9858	202	3	7	68	4190
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	ND	6293	32110	142	8394	26579	377.2	9.4	7	172.3	22270

ND = not detected.

B = compound detected in method blank and excluded from total.

J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907

93-1016/VOCGW994.WK1

Table XI (Cont'd)
Summary of Volatile Organic Compounds in Ground Water

DRAI Sample No.:	WE-2R/B	WE-3	WE-4	Field Blank
Lab Sample No.:	E431290	E431283	E431281	E431287
Date Sampled:	09/19/94	09/19/94	09/19/94	09/19/94
Laboratory:	Accutest	Accutest	Accutest	Accutest
Targeted VOCs (ppb)				
Acetone	ND	ND	ND	ND
Acrolein	ND	ND	ND	ND
Acrylonitrile	ND	ND	ND	ND
Benzene	870	ND	ND	ND
Bromoform	ND	ND	ND	ND
Bromodichloromethane	ND	ND	ND	ND
Bromomethane	ND	ND	ND	ND
Carbon Tetrachloride	ND	ND	ND	ND
Chlorobenzene	4600	ND	ND	ND
Chloroethane	ND	ND	ND	ND
2-Chloroethyl Vinyl Ether	ND	ND	ND	ND
Chloroform	ND	ND	ND	ND
Chloromethane	ND	ND	ND	ND
cis-1,3-Dichloropropene	ND	ND	ND	ND
Dibromochloromethane	ND	ND	ND	ND
1,2-Dichlorobenzene	2600	ND	ND	ND
1,3-Dichlorobenzene	260	ND	ND	ND
1,4-Dichlorobenzene	1500	ND	ND	ND
1,1-Dichloroethane	ND	ND	ND	ND
1,2-Dichloroethane	2100	ND	ND	ND
1,1-Dichloroethylene	ND	ND	ND	ND
trans-1,2-Dichloroethylene	ND	ND	ND	ND
trans-1,3-Dichloropropene	ND	ND	ND	ND
1,2-Dichloropropane	ND	ND	ND	ND
Ethylbenzene	600	ND	ND	ND
Methylene Chloride	ND	ND	ND	ND
1,1,2,2-Tetrachloroethane	ND	ND	ND	ND
Tetrachloroethylene	ND	ND	ND	ND
Toluene	4600	ND	ND	ND
1,1,1-Trichloroethane	ND	ND	ND	ND
1,1,2-Trichloroethane	ND	ND	ND	ND
Trichloroethylene	ND	ND	ND	ND
Trichlorofluoromethane	ND	ND	ND	ND
Vinyl Chloride	ND	ND	ND	ND
Xylene (Total)	1600	ND	ND	ND
TOTAL TARGETED VOCs (ppb):	18730	ND	ND	ND
TOTAL NON-TARGETED VOCs (ppb):	4370	3	ND	ND
TOTAL TARGETED AND NON-TARGETED VOCs (ppb):	23100	3	ND	ND

ND - not detected.

B - compound detected in method blank and excluded from total.

J - estimated concentration detected below the Method Detection Limit.

Table XII
Summary of TAL Metals in Ground Water

DRAI Sample No.:	CPS-1	CPS-1	CPS-2	CPS-2	CPS-3	CPS-3	WCC-1M	WCC-1M	WCC-4S	WCC-4S
	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved	Total	Dissolved
Lab Sample No.:	E431270	E431271	E431271	E431269	E431277	E431278	E431275	E431276	E431272	E431273
Date Sampled:	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Metals (ppb)										
Aluminum	37000	35000	160000	3200	1800	<200	10000	10000	4000	3600
Antimony	10	9.0	<5.0	11	<5.0	<5.0	<5.0	12	<5.0	11
Arsenic	18	11	77	<5.0	8.1	7.0	<5.0	<5.0	<5.0	<5.0
Barium	<200	<200	610	<200	<200	<2000	<200	<200	<200	<200
Beryllium	<5.0	<5.0	8.6	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium	22	27	8.5	4.3	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Calcium	18000	20000	28000	<5000	31000	31000	15000	15000	17000	16000
Chromium	84	76	1400	11	<10	<10	<10	<10	<10	<10
Cobalt	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Copper	21000	26000	38000	5100	<25	<25	38	51	<25	42
Iron	73000	84000	220000	11000	51000	53000	590	110	980	580
Lead	40	39	830	20	<3.0	<3.0	20	17	5.7	5.1
Magnesium	5000	5300	12000	<5000	<5000	<5000	<5000	<5000	<5000	<5000
Manganese	550	560	430	160	360	360	310	310	250	240
Mercury	<0.20	<0.20	1.5	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Nickel	170	200	120	46	<40	<40	86	88	<40	<40
Potassium	5900	6200	12000	<5000	<5000	<5000	<5000	<5000	<5000	<5000
Selenium	7.3	<5.0	14	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Silver	<10	<10	21	<10	<10	<10	<10	<10	<10	<10
Sodium	40100	45000	5800	6400	43000	44000	33000	33000	21000	20000
Thallium	21	<5.0	11	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	470	450	1500	67	<50	<50	<50	<50	<50	<50
Zinc	9200	12000	6400	3300	<20	<20	470	480	140	150

ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907
D3-3848/TALME994.WK1

Table XII (Cont'd)
Summary of TAL Metals in Ground Water

DRAI Sample No.:	WCC-5S Total	WCC-5S Dissolved	WCC-6S Total	WCC-6S Dissolved	WE-2R/A Total	WE-2R/A Dissolved	WE-2R/B Total	WE-2R/B Dissolved	WE-3 Total	WE-3 Dissolved
Lab Sample No.:	E431285	E431286	E431279	E431280	E431288	E431289	E431290	E431291	E431283	E431284
Date Sampled:	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94	9/19/94
Laboratory:	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest	Accutest
Metals (ppb)										
Aluminum	6900	6000	3300	2800	360	<200	310	<200	3700	3500
Antimony	<5.0	18	<5.0	7.9	<5.0	<5.0	<5.0	6.8	<5.0	8.4
Arsenic	6.5	<5.0	<5.0	<5.0	11	9.4	10	9.5	9.7	6.5
Barium	<200	<200	<200	<200	<200	<200	<200	<200	<200	<200
Beryllium	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Cadmium	<4.0	4.2	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
Calcium	12000	12000	21000	22000	9900	10000	9900	10000	7200	7400
Chromium	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Cobalt	<50	<50	<50	<50	<50	<50	<50	<50	<50	<50
Copper	37	54	<25	29	<25	<25	<25	<25	50	39
Iron	14000	340	24000	14000	76000	76000	77000	76000	26000	24000
Lead	9.9	8.3	4.7	<3.0	<3.0	3.7	<3.0	<3.0	27	3.2
Magnesium	<5000	<5000	5000	<5000	<5000	<5000	<5000	<5000	<5000	<5000
Manganese	470	460	490	480	280	280	280	280	450	440
Mercury	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.22	<0.20	<0.20	<0.20
Nickel	<40	<40	<40	42	<40	<40	<40	<40	<40	41
Potassium	<5000	<5000	<5000	<5000	6400	6500	6400	6400	<5000	<5000
Selenium	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Silver	<10	<10	<10	<10	<10	<10	<10	<10	<10	<10
Sodium	11000	12000	17000	18000	76000	76000	76000	75000	26000	25000
Thallium	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0
Vanadium	180	<50	<50	<50	<50	<50	<50	<50	<50	<50
Zinc	320	350	340	310	22	<20	<20	21	520	460

ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907
D3-3848/TALME094.WK1

Table XII (Cont'd)
Summary of TAL Metals in Ground Water

DRAI Sample No.:	WE-4 Total		WE-4 Dissolved		FB Total	
Lab Sample No.:	E431281		E431282		E431287	
Date Sampled:	9/19/94		9/19/94		9/19/94	
Laboratory:	Accutest		Accutest		Accutest	
Metals (ppb)						
Aluminum	160000		<200		<200	
Antimony	<5.0		5.9		<5.0	
Arsenic	34		<5.0		<5.0	
Barium	890		<200		<200	
Beryllium	<5.0		<5.0		<5.0	
Cadmium	5.0		<4.0		<4.0	
Calcium	190000		69000		<5000	
Chromium	380		<10		<10	
Cobalt	<50		<50		<50	
Copper	540		<25		<25	
Iron	770000		<100		<100	
Lead	190		<3.0		<3.0	
Magnesium	14000		<5000		<5000	
Manganese	870		140		<15	
Mercury	0.70		<0.20		<0.20	
Nickel	78		<40		<40	
Potassium	18000		<5000		<5000	
Selenium	<5.0		<5.0		<5.0	
Silver	<10		<10		<10	
Sodium	35000		29000		<5000	
Thallium	<5.0		<5.0		<5.0	
Vanadium	190		<50		<50	
Zinc	1400		<20		<20	

ND = not detected.
B = compound detected in method blank and excluded from total.
J = estimated concentration detected below the Method Detection Limit.

DRAI Job No. 91C907
D3-3040/TALME994.WK1

APPENDIX

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Appendix B-1

Soil Boring Sample Collection Protocol

SOIL BORING SAMPLE COLLECTION PROTOCOL

Field Investigation Procedures
Dan Raviv Associates, Inc.

Table of Contents

SOIL BORING SAMPLE COLLECTION PROTOCOL
for
CPS Chemical Company
Field Investigation Procedures
Dan Raviv Associates, Inc.

1.0 SCOPE

This protocol outlines procedures and equipment for the collection of representative soil samples.

2.0 INITIAL DRILLING EQUIPMENT PREPARATION

Before drilling begins, an on-site area will be designated for equipment cleanup. The area will be designed or prepared in such a way that all washing fluids and soil can be collected for proper disposal.

Prior to advancing any borings, the drilling equipment (e.g. rigs, tripods, hand augers) must be thoroughly cleaned to remove all remains of previous drilling operations (i.e., dirt, mud, dust and liquids). Cleaning of drilling rigs includes wheels or tracks, undercarriage, chassis and cab. Acceptable cleaning methods include, but are not limited to:

(a) brushing, sweeping and/or vacuuming loose dirt;
(b) detergent wash and tap water rinse;
(c) steam cleaning;
(d) air drying.

In addition to the item listed above, specific sampling equipment (e.g. split-spoon samplers) will require additional cleaning as described in Section 5.0 of this protocol.

3.0 DRILLING PROCEDURES

Reasonable precaution must be taken to contain, drilling fluids (if any) and drill cuttings. As down-hole equipment is removed from the ground, loose soil will be removed. Soil will be stockpiled on and covered with plastic or placed in drums for temporary storage prior waste classification sampling (if necessary) and proper disposal. When results of the analyses of waste classification samples for the stockpiled or drummed materials are received, the soil will be disposed of in accordance with NJDEPE Waste Management regulations.

4.0 DRILLING EQUIPMENT CLEANING PROCEDURES BETWEEN BORING SITES

After preliminary cleaning (at the soil boring location) has been completed, drilling equipment which includes, but is not limited to, augers, and other tools and equipment which came in contact with either soil or ground water will be taken to the designated cleanup area. The cleanup procedure will be as follows:

(a) Thorough washing with detergent and tap water using a scrub brush;
(b) Rinse with tap water;
(c) Steam clean;
(d) Air dry;

This cleanup will be performed after each borehole site has been completed and prior to movement of any equipment to the next borehole site.

Upon completion of the drilling program, soil, and washing fluids will be disposed of in a properly licensed disposal facility permitted to accept such wastes.

5.0 SAMPLING EQUIPMENT CLEANING PROCEDURES

Prior to soil sample collection, all soil sampling tools (e.g. split spoons, Shelby tubes, and scoopulas) will be cleaned in the following manner:

(a) Non-phosphate detergent and tap water wash.
(b) Tap water rinse.
(c) Distilled/deionized water rinse.
(d) 10% Nitric acid rinse (if metals analysis is required).
(e) Distilled/deionized water rinse (if metals analysis is required).
(f) Acetone (pesticide grade) rinse.
(g) Total air dry.
(h) Distilled/deionized water rinse.

Large sampling tools which are re-used rapidly (e.g. split spoons) will be cleaned in the field. If these tools are not to be used for any length of time, they will be foil wrapped and secured.

Smaller sampling tools (e.g scoopulas) should be laboratory cleaned. After cleaning, they will be foil wrapped and placed into ziplock bags (up to five per bag). An equipment cleaning custody record form will be partially completed and placed with the sampling tools in the ziplock bag. This form will be completed after use of the sampling tools in the field and will be stored in the project file.

All sampling equipment will remain wrapped until ready for use and will be stored in an area where no contamination will occur.

6.0 SOIL SAMPLING PROCEDURES

The procedures below describe use of split-spoon samplers for soil sample collection, since these are the most frequently used sampling tool. However, the described procedure may be adapted for sampling using other equipment. Soil samples will be collected using a split-spoon sampler in the following manner:

(a) The sample location will be measured relative to at least two permanent landmarks so that the location can be reproduced with an accuracy of one foot.

(b) The split spoon will be driven to a prescribed depth or until refusal (when 100 blow counts does not drive the spoon past a 6-inch interval) and then withdrawn. If split-spoon sampling is to be initiated at depths of greater than two feet, the drill hole will be advanced to the top of the desired sample-depth interval.

(c) After removing the split spoon from the ground, the sample will be collected as quickly as possible.

(d) All loose material will be removed from the external surface of the sampler prior to opening the split spoon.

(e) The sampler will be placed on clean plastic sheeting and opened. Total sample recovery will be measured. HNu readings will be obtained by carefully separating the sample using dedicated stainless steel scoopulas. If distinctly different layers are present, a new scoopula will be used for each layer. The lithology of the sample will then be recorded in detail. In addition to the lithologic description of the sampled interval, information on soils from shallow depths will be obtained from soil cuttings and drilling speed.

(f) Soil samples collected at each sampled interval will be placed in appropriate sample jars; the sampled interval should correspond to no more than a six-inch depth interval. Occasionally, it may be necessary to estimate the sample interval if the recovery is poor. Care will be taken to minimize cross-contamination from one interval to another. Non-representative material, such as twigs or large pebbles, will not be included in the sample.

(g) Immediately following sample collection, the sample container will be wiped clean and labelled, stored in a plastic ziplock bag, and placed on ice inside a cooler.

7.0 BOREHOLE CLOSURE

After the collection of the final sample from a boring, the borehole (if greater than 10 feet in depth or if ground water is encountered) will be backfilled with a bentonite/cement slurry mixture.

8.0 FIELD QUALITY ASSURANCE/QUALITY CONTROL

8.1 Field Duplicates

Ten percent of the samples, or a minimum of one per day, will be duplicated to validate the precision of the sampling technique.

8.2 Travel Blanks

If samples are to be analyzed for volatile organic compounds, a travel blank will accompany the sample containers through the entire sampling program. Travel blanks for other parameters will be collected as necessary to meet regulatory requirements. The travel blank will be supplied by the laboratory or filled with laboratory analyzed deionized/distilled water prior to beginning field work. The travel blank(s) will be analyzed for volatile organic compounds or the parameters of concern when returned to the laboratory. The results of these analyses will validate both glassware cleaning and field sample handling techniques. If travel blanks are necessary, a minimum of one travel blank must accompany each shipment of samples delivered to the laboratory.

8.3 Field/Rinse Blanks

Prior to any sampling, a field/rinse blank may be collected. To collect a field blank, the decontaminated soil sampling apparatus (i.e., split spoon) will be rinsed using deionized/distilled water which will be collected in the appropriate glassware. The deionized/distilled water for the rinse blank will be supplied by laboratory performing the analysis or demonstrated analyte free. Analysis of this rinse blank will verify the equipment cleaning procedure.

9.0 RECORD KEEPING

9.1 Field Data

All field data will be recorded in the field sampler's bound notebook. This data will include (but is not limited to): weather conditions, soil lithology, HNu readings, presence of odors, and the sequence in which the soil samples were collected.

9.2 Chain of Custody

A chain of custody form will be maintained during sample collection; this form will be included with the samples.

9.3 Analysis Request Form

A request for analysis form will be sent with the samples to the laboratory. The form will indicate which analysis will be performed.

9.4 Transportation

Prior to off-site transportation, samples will be inspected to insure they are properly labeled and tightly capped. Sample containers will be stored in ziplock plastic bags and placed on ice in a cooler for delivery to the laboratory.

Table I

Sample Containers and Holding Times

The following holding times, preservatives and container types will be used for the soil sample collection:

Parameter	Container	Maximum Holding Time (1)
Metal	glass	6 months
Mercury	glass	28 days
Pesticides/PCB's	glass with teflon or foil lined cap	7 days (2)
Herbicides	glass with teflon or foil lined cap	7 days (2)
Soil Acidity	glass	14 days
Volatile Organics (3) (including carbon disulfide)	40ml teflon lined vial septum	14 days
Thiocyanate	glass	14 days
Extractible Organics	glass with teflon or foil lined cap	7 days (2)
2,3,7,8,-TCDD (Dioxin)	glass with teflon or foil lined cap	90 days
Gross Alpha, Gross Beta	glass	6 months
Petroleum (3) Hydrocarbons	40 ml teflon lined septum	7 days

(1) All samples must be maintained on ice from the time of collection until their arrival at the laboratory.
(2) Number of days within which sample must be extracted.
(3) Collect without headspace.

Appendix B-2

Ground Water Sample Collection Protocol

GROUND WATER SAMPLE COLLECTION PROTOCOL

Field Investigation Procedures
Dan Raviv Associates, Inc.

Table of Contents

GROUND WATER SAMPLE COLLECTION PROTOCOL
for
CPS Chemical Company
Field Investigation Procedures
Dan Raviv Associates, Inc.

1.0 SCOPE

This protocol outlines procedures and equipment for the collection of representative ground water samples from monitoring wells.

2.0 EQUIPMENT

2.1 Pumping Equipment

Pumps and cables will be cleaned prior to initial use and after pumping each well in the following manner:

(a) external surfaces will be brushed free of all loose material, washed with non-phosphate detergent and tap water and rinsed with clean tap water;
(b) internal surfaces of submersible pumps will be cleaned by first operating the pump in a clean drum with detergent solution and then in a second drum of clean tap water. Internal surfaces of other pumps will be cleaned by pumping detergent solution and then clean tap water through the pump;
(c) the pumping equipment will be wrapped in plastic sheeting for transportation and storage.

Cleaning solutions will be contained and disposed of properly.

2.2 Sampling Equipment

A bailer constructed of inert material, such as Teflon, will be dedicated to an individual well for sampling. A stainless steel or teflon lead will be attached directly to the bailer. Bailers and leads will be laboratory cleaned prior to use in the field in the following manner:

(a) Non-phosphate detergent and tap water wash.
(b) Tap water rinse.
(c) Distilled/deionized water rinse.
(d) 10% Nitric acid rinse (if metal analysis is required).
(e) Distilled/deionized water rinse.
(f) Acetone (pesticide grade) or hexane rinse for RCRA.
(g) Total air dry.
(h) Distilled/deionized water rinse.
(i) Wrap in aluminum foil and security taped immediately after cleaning.

An equipment cleaning custody record will be partially completed and taped to the bailer. This form will be completed after use of the bailer in the field and then stored in the project file.

2.3 Miscellaneous Equipment
Electric water level indicators, measuring tapes, and product/water interface probes will be cleaned prior to every use by the the following procedure:

(a) wipe with acetone soaked paper towel or rinsed with a wash bottle containing acetone;
(b) air dry;
(c) rinse with deionized water.

3.0 WELL EVACUATION AND SAMPLE COLLECTION

3.1 General
Wells to be sampled may be completed in different aquifers such as a confined bedrock aquifer or a water table aquifer. The condition of the wells and their ability to yield water may vary greatly from one well to another due to the hydrogeologic properties of the aquifer at any given location. Therefore, it may be necessary for the hydrogeologist to modify procedures as sampling progresses in order to assure that ground water samples obtained from monitoring wells are representative of water quality from the specific aquifer. The general procedures to be used are presented below.

3.2 Well Security
All monitoring wells should have been fitted with a protective casing and locking cap. Wells will be unlocked immediately prior to initiating sampling procedures. All wells will be locked when sampling is completed and at any time the sampling team leaves the sampling area.

3.3 Site Preparation
Before work begins at a well location, the immediate area surrounding the well will be covered with plastic. All equipment used during the evacuation and sampling processes, e.g., water level indicators and sample containers will be placed on this plastic.

3.4 Preliminary Measurements
The water level, diameter and the total depth of each well will be measured in order to calculate the total volume of the water column. Measurement of the total well depth will also help determine if the well is in good condition (i.e. has not silted). Water measurements will be made with electric water level indicator to the nearest 0.01 foot from a designated location at the top of the inner well casing. The thickness of any separate phase (e.g. floating or sinking product) will also be measured to the nearest 0.01 foot.

3.5 Well Evacuation
To obtain a representative sample of the ground water, wells will be purged prior to sample collection. Three to five volumes of water will be pumped from each well using a pump and dedicated polyethylene tubing. During purging, the pump intake will not be set more than six feet below the

dynamic water level, which may require that the pump be lowered and depth of pumping adjusted during purging.

It may not be possible to pump three to five volumes of ground water from wells with very slow recovery rates. At such wells, the pumping rate will be reduced to less than one gallon per minute to extend both the pumping time and increase the volume of purged water. These wells shall not be evacuated to dryness but rather will be allowed to recover between purging.

Pump type used, pumping times, volume of purged water, and the physical characteristics of the water (i.e., turbidity, color, odor etc.) will be documented. Care will be taken to minimize splashing and leakage of water during pumping.

3.6 Disposal of Pumped Water

Water from wells being sampled for the first time will be containerized until the analytical results of the ground water samples have been received. Ground water from any well containing contaminants above NJDEPE regulations will be disposed of properly. Ground water which does not contain contaminants above NJDEPE regulations will be disposed of on site.

Ground water from wells which have been previously sampled will be containerized if earlier results detected contaminants above NJDEPE regulations; otherwise, the ground water will be disposed of on site.

3.7 Sampling Procedures

If the degree of ground water contamination is known or suspected, wells will be sampled in the order of ascending contamination. Ground water samples will be collected following 80% recovery of the water column, but no later than two hours after purging (or the last purging for slow recovery wells).

At each well, new clean nylon cord of appropriate length will be attached to the bailer leads and used to lower bailers into the wells. New cord and disposable gloves will be used at each well. New disposable gloves will be worn when handling bailers and cord. Care will be taken to prevent bailers or cord from coming into contact with any contaminated surface.

Bailers will be lowered gently into the wells to minimize agitation of the ground water. Ground water samples will be poured from the bailers directly into bottles previously prepared and supplied by the laboratory (Table I). Pouring will be accomplished in a manner that will minimize splashing and agitation of samples.

The sample bottles will be filled in the order identified in the regulatory requirement for the site. A suggested collection order would be: volatile organics, extractable organics, metals, and miscellaneous parameters such as sulfate and chloride.

After use, and completion of the cleaning record form, the bailer will be placed in plastic for transportation.

If there is no access through which to introduce a bailer into the well (i.e., there is a pump in the well or the well head is buried) the well will be sampled from the sampling port, such as a faucet, closest to the well head. Water will be run at a maximum flow rate through the sampling port for at least ten minutes prior to sampling. For sampling, the flow rate will be reduced to minimize agitation.

All samples must be placed on ice and protected from light immediately after collection until delivery to the laboratory. The presence of any equipment, such as a pressured tank which could influence sample characteristics, will be recorded.

3.8 <u>Field Measurements</u>
Field measurements of the specific conductance, pH, and temperature of the water from each well will be performed both prior to purging and during ground water sampling. Prior to each use, the field equipment will be cleaned in accordance with manufacturers recommendations and will include, at a minimum, a thorough rinse with distilled/deionized water.

3.9 <u>Sample Filtering</u>
Samples for metals analysis which must be filtered to determine dissolved (filtered) metal concentrations rather than total (unfiltered) metal concentrations. On occasion, samples for other parameters, e.g. pesticides, may also be filtered in order to differentiate between dissolved and total concentrations.

Samples will be filtered on site using a peristaltic pump and a 0.45 micron membrane disposable in-line filter, or a "Millipore" filter apparatus.

If a disposable in-line filter is used, samples will be collected in a clear jar prior to filtering. Dedicated tubing and filters will be used for each sample.

If a "millipore" filter apparatus is used, the Samples requiring a "pre-filter" step will be filtered with glass paper. A final filter will consist of 0.45 micron membrane.

Filter apparatus will be cleaned prior to and after each use in the following manner:

(1) mild non-phosphate detergent wash;
(2) tap water rinse;
(3) 1:1 nitric acid rinse;
(4) distilled/deionized water (DI) rinse;
(5) 1:1 nitric acid; and
(6) deionized/distilled water rinse

This represents the minimum cleaning procedure. The nitric acid followed by distilled/deionized rinse should continue until there is no doubt that a thorough cleaning has been accomplished. The procedure may be modified to include a rinse with "Freon TF" prior to the detergent wash if the sample was contaminated with oils.

4.0 FIELD QUALITY ASSURANCE QUALITY CONTROL

4.1 Field Duplicates

Ten percent of the samples, or a minimum of one per day, will be duplicated to validate the precision of the sampling technique.

4.2 Travel Blanks

If samples are to be analyzed for volatile organic compounds, a travel blank will accompany the sample containers through the entire sampling program. Travel blanks for other parameters will be collected as necessary for regulatory requirements. The travel blank will be supplied by the laboratory or filled with laboratory analyzed distilled/deionized water prior to beginning field work. The travel blank will be analyzed for volatile organics or the parameter of concern when returned to the laboratory. The results of this analysis will validate both glassware cleaning and field sample handling techniques. If travel blanks are necessary, a minimum of one travel blank will accompany each shipment of samples delivered to the laboratory.

4.3 Rinse/Field Blanks

Prior to any sampling, a field/rinse blank may be collected. To collect a field blank, the clean bailer (cleaned using the procedure outlined above) will be rinsed using deionized/distilled water which will be collected in the appropriate glassware. The analytical laboratory performing the analysis will supply the deionized/distilled water or the water will be demonstrated analyte free. Analysis of this rinse blank for will verify the bailer cleaning procedure.

4.4 Filtering Equipment Rinse Blanks

If filtering is required, a rinse blank may be collected from the cleaned apparatus by running laboratory provided deionized/distilled water through the entire filtering procedure (i.e. pre-filter with glass paper, final filter with 0.45 micron membrane). Analysis of this rinse blank for the parameters of interest (e.g. dissolved metals) will validate glassware cleaning procedures.

5.0 RECORD KEEPING

5.1 Field Data

All field data will be recorded in the field sampler's bound notebook. This data will include (but is not limited to): weather conditions, volume of water removed from the well, physical characteristics of the ground water, static water level prior to sampling, well number or location and the sequence in which the wells were sampled and ground water samples collected.

5.2 Chain of Custody
A chain of custody form will be maintained during sample collection; this form will be included with the samples.

5.3 Analysis Request Form
A request for analysis form will be sent with the samples to the laboratory. The form will indicate which analysis will be performed.

5.4 Transportation
Prior to off-site transportation, samples will be inspected to insure they are properly labeled and tightly capped. Sample containers will be stored in ziplock plastic bags and placed on ice in a cooler for delivery to the laboratory.

TABLE I

SAMPLE CONTAINERS AND HOLDING TIME

The following holding times and preservatives will be used:

Parameter	Container	Preservative	Maximum Holding Time
Volatile Organics	40 ml septum vial w/teflon-lined cap, and no air bubbles	Cool to 4°C	7 days.
Base Neutrals	Glass with teflon-lined cap	Cool to 4°C	Must be extracted within 7 days. Extract must be analyzed within 40 days.
Petroleum Hydrocarbons	Glass	HCl or H_2SO_4 to pH2	7 days.
Total Phenol	Glass	H_2SO_4 to pH 2 1 gr. $CuSO_4$/liter	24 hours.
Pesticides & PCB's	Glass w/teflon- or foil cap liner	Cool to 4°C	Must be extracted within 7 days. Extract must be analyzed within 40 days.
Herbicides (2,4-D & 2,4,5-TP)	Glass with teflon or foil cap liner	Cool to 4°C	Must be extracted within 7 days. Extract must be analyzed within 40 days.
Metals (3)	Glass w/teflon-lined cap or polyethylene	HNO_3 to pH 2	6 months.
Mercury	Glass w/teflon-lined cap or polyethylene	HNO_3 to pH 2	28 days.
Cyanide	Glass or polyethylene	NaOH to pH 12	24 hours.

(1) All samples should be collected with a 1-inch air space in container, with the exception of volatile organics.

(2) All samples must be stored @ 4°C from time of collection until arrival at lab.

(3) If required, the samples collected for metals analysis will be filtered on site down to 0.45 micron before pH adjustment.

Appendix B-3

Monitoring Well Installation Protocol

MONITORING WELL INSTALLATION PROTOCOL

Field Investigation Procedures
Dan Raviv Associates, Inc.

Table of Contents

MONITORING WELL INSTALLATION PROTOCOL
for
CPS Chemical Company
Field Investigation Procedures
Dan Raviv Associates, Inc.

1.0 SCOPE

This protocol outlines procedures and equipment used for the drilling and installation of monitoring wells.

2.0 DRILLING EQUIPMENT PREPARATION

Before drilling begins, an on-site area will be designated for equipment cleanup. The area will be designed or prepared in such a way that all washing fluids and soils can be collected for proper disposal.

Prior to well installation, the drill rig, all tools, and accessories must be thoroughly cleaned to remove all remains of previous drilling operations (i.e., dirt, mud, dust and liquids). Cleaning of the rig includes wheels or tracks, under carriage, chassis and cab. Acceptable cleaning methods include, but are not limited to:

(a) brushing, sweeping and/or vacuuming loose dirt;
(b) detergent wash and tap water rinse;
(c) steam cleaning;
(d) air drying.

In addition to the equipment listed above, the following specific items will also require cleaning: split-barrel samplers, auger flights and all other down-hole tools. These items must be free of grease, oil and other forms of contamination prior to use.

3.0 DRILLING PROCEDURES

If sufficient information regarding site conditions is known, wells will be drilled in order of ascending contamination. During drilling, the work area and soil cuttings will be monitored using an HNu photoinization detector (HNu) to to screen for the presence of volatile organic compounds.

Reasonable precaution must be taken to contain drilling fluids (if any), drill cuttings, and ground water returned to the surface during drilling. As the down-hole equipment is removed from the ground, loose soil will be removed. Soil will be stockpiled on and covered with plastic or placed in drums for temporary storage prior to waste classification sampling (if necessary) and proper disposal. Stockpiled or drummed soils will be disposed of in accordance with NJDEPE Waste Management regulations.

4.0 DRILLING EQUIPMENT CLEANING PROCEDURES BETWEEN WELL SITES

After preliminary cleaning (at the well site) has been completed, drilling equipment which includes, but is not limited to, augers, mud tub, and other tools and equipment which came in contact with either soil or ground water will be taken to the designated cleanup area. Equipment will be cleaned in the following manner:

(a) Thorough washing with detergent and tap water using a scrub brush;
(b) Rinse with tap water;
(c) Steam clean;
(d) Air dry.

This cleanup will be performed following the installation of each monitoring well before moving any equipment to the next well installation location.

Upon completion of the drilling program, contaminated soil and washing fluids will be disposed of in a properly licensed facility permitted to accept such wastes.

5.0 WELL CONSTRUCTION

Wells will be drilled and installed by a driller licensed in the state in which the work is being performed, and well construction will conform with regulatory requirements. Wells will be completed using a protective casing at the ground surface. A permanent mark will be placed on the top of the inner well casing; the permanent mark will be surveyed and will be used when obtaining distance to ground water measurements. The well will be labelled with both the well designation and permit number issued by the NJDEPE.

6.0 WELL DEVELOPMENT

After installation, wells will be developed by pumping the ground water until the water is clean or for a minimum of one hour. All fluids generated during well development will be containerized and disposed of properly. General assessment of well yield, influence on adjacent wells, and water quality will be recorded.

After development, the wells will be locked and allowed to stand for at least two weeks prior to ground water sampling.

7.0 RECORD KEEPING

All field data will be recorded by the geologist in a bound notebook. This data will include, but is limited to, weather conditions, well location, well depth, the sequence in which the wells were completed, and well completion data. The drilling speed, soil cuttings, and split-spoon sampling may be used to document the following: soil color and type, approximate grain size, physical characteristics (i.e. moisture, visible contamination and HNu readings), horizon depths and thicknesses, depth to ground water and bedrock (if encountered).

Appendix B-4

Equipment Cleaning and Custody Record

Dan Raviv Associates, Inc.
57 East Willow Street Millburn, New Jersey 07041
(201) 564 6006

ILER AND SAMPLING EQUIPMENT ● CLEANING AND CUSTODY RECORD

Affix to foil wrapped sampling equipment after having followed the DRAI approved cleaning procedure.

Type of Equipment cleaned: ______________________

Date & Time cleaned: ______________________

Technician's signature: ______________________

Check which of the following cleaning steps were performed:

- ☐ 1. Non-phosphate detergent and tap water wash.
- ☐ 2. Tap water rinse.
- ☐ 3. Distilled/Deionized water rinse.
- ☐ 4. 10% nitric acid rinse.
  Only if sample is to be analyzed for metals.
- ☐ 5. Distilled/Deionized water rinse.
- ☐ 6. Acetone (Pesticide grade)
- ☐ 7. Total air dry.
  Acetone is an acceptable cleaning solvent provided that it is allowed to totally evaporate and is followed by distilled/deionized rinse.
- ☐ 8. Distilled/Deionized water rinse.

Person accepting custody of sampling equipment:

Signature	Date	Time

Sample collected with this sampling equipment:

Sample Designation	DRAI Job Number

◆ IMPORTANT - RETAIN THIS CUSTODY RECORD WITH THE SAMPLE CHAIN OF CUSTODY. ◆

Do not use sampling equipment if foil is broken. Unwrap immediately before use.

Appendix B-5

Sample Chain of Custody Record

Dan Raviv Associates, Inc.
57 East Willow Street Millburn, New Jersey 07041
(201) 564-6006

CHAIN OF CUSTODY RECORD

Project Number ______________________ Project Name ______________________

Location ______________________ Laboratory ______________________

Sample Number	Type (Water/Soil)	Date	Time	Total Number of Containers	Samplers Signature	Remarks

Relinquished By:	Date/Time:	Received By:	Comments/Condition:
Relinquished By:	Date/Time:	Received By:	Comments/Condition:
Method of Shipment:	Shipped By:	Received By:	Comments/Condition:

Received by Laboratory: ______________________ Date/Time: ______________________

____
Signature

DRAI Revised: 3/90

Appendix B-6

Sample Analysis Request Form

Dan Raviv Associates, Inc.
57 East Willow Street Millburn, New Jersey 07041
(201) 564-6006

SAMPLE ANALYSIS REQUEST FORM

Job Number: ______________________ Job Location: ______________________

Samples Collected By: ______________________ Sampling Date: ______________________

Time Sampling Began: ______________________ Finished: ______________________

Collection Method: ____

Sampling Equipment Used: ____

Sample Matrix: Soil ☐ Sediment ☐ Sludge ☐ Water ☐ Other ☐ __________

Was Chain of Custody Implemented? Yes ☐ No ☐

Were Samples Maintained on Ice Immediately Following Collection? Yes ☐ No ☐

ANALYSIS REQUESTED

Parameter	Container ID	Preservative Used	Method of Analysis (i.e., 624, etc.)	Detection Limit(s)	Requested Turnaround Time(Days)

COMMENTS: ☐ ECRA ☐ Enforcement ☐ Other

Deliverables Required: Tier I ☐ Tier II ☐ Normal QC ☐ Other ☐ Specify

Analysis Requested by: ____

DRAI Project Manager Review and Approval: ______________________

Person Accepting Sample: ______________________ Date: __________ Time: __________

Lab Name: ______________________ Lab I.D. # ______________________

Appendix C

Analytical Methods Reference

ANALYTICAL METHOD REFERENCES

PARAMETER	METHOD NUMBER	REFERENCE
Volatile Organics	CLP 2/88	1
Acid-Base/Neutral Extractables	CLP 2/88	1
Pesticides/PCB's	CLP 2/88	1
Metals	CLP 7/88	2
Cyanide	CLP 7/88	2
Hexavalent Chromium		
Water	218.4	3
Soil/Sediment	Extraction-3060	4
	Analysis-7196	5
Air	89-166.1	6
Sulfate		
Water	375.2	3
Soil/Sediment	375.3	3
Fluoride	340.2	3

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1 U.S. EPA Contract Laboratory Program Statement of Work for Organic Analysis Multi-media Multi-concentration, U.S. EPA 10/86 revised 2/88.

2 U.S. EPA Contract Laboratory Program Statement of Work for Inorganic Analysis Multi-media Multi-concentration, U.S. EPA, SOW No. 7/88.

3 Methods for the Chemical Analysis of Water and Wastes, EPA-600/4-79-020, revised 1983.

4 Test Methods for Evaluating Solid Waste Physical/Chemical Methods, EPA SW-846, 2nd edition, 1984.

5 Test Methods for Evaluating Solid Waste Physical/Chemical Methods, EPA SW-846, 3rd edition, 1986.

6 Determination of Ambient Levels of Hexavalent Chromium by Ion Chromotography, Method 89-166.1, California Air Resources Board, Monitoring and Laboratory Division, El Monte, CA, 1989 (see Attachment B for Procedures).

Appendix D

<u>Appendix No.</u>

Appendix D-1

EPA-CLP Control Limits for VOCs and B/Ns

ATTACHMENT 1

SURRAGATE RECOVERY LIMITS

FROM EPA-CLP

TABLE 4.2. CONTRACT REQUIRED SURROGATE SPIKE RECOVERY LIMITS

Fraction	Surrogate Compound	Water	Low/Medium Soil
BNA	Nitrobenzene-d_5	35-114	23-120
BNA	2-Fluorobiphenyl	43-116	30-115
BNA	p-Terphenyl-d_{14}	33-141	18-137
BNA	Phenol-d_5	10-94	24-113
BNA	2-Fluorophenol	21-100	25-121
BNA	2,4,6-Tribromophenol	10-123	19-122

TABLE 4.2. CONTRACT REQUIRED SURROGATE SPIKE RECOVERY LIMITS

Fraction	Surrogate Compound	Water	Low/Medium Soil
VOA	Toluene-d_8	88-110	81-117
VOA	4-Bromofluorobenzene	86-115	74-121
VOA	1,2-Dichloroethane-d_4	76-114	70-121

Appendix D-2

EPA-CLP Control Limits for Matrix Spikes

ATTACHMENT 2

MS/MSD CONTROL LIMITS

FROM EPA-CLP

TABLE 5.2. MATRIX SPIKE RECOVERY LIMITS

Fraction	Matrix Spike Compound	Water	Soil/Sediment
BN	1,2,4-Trichlorobenzene	39-98	38-107
BN	Acenaphthene	46-118	31-137
BN	2,4-Dinitrotoluene	24-96	28-89
BN	Pyrene	26-127	35-142
BN	N-Nitroso-Di-n-Propylamine	41-116	41-126
BN	1,4-Dichlorobenzene	36-97	28-104
Acid	Pentachlorophenol	9-103	17-109
Acid	Phenol	12-89	26-90
Acid	2-Chlorophenol	27-123	25-102
Acid	4-Chloro-3-Methylphenol	23-97	26-103
Acid	4-Nitrophenol	10-80	11-114

TABLE 5.2. MATRIX SPIKE RECOVERY LIMITS

Fraction	Matrix Spike Compound	Water	Soil/Sediment
VOA	1,1-Dichloroethene	61-145	59-172
VOA	Trichlorethene	71-120	62-137
VOA	Chlorobenzene	75-130	60-133
VOA	Toluene	76-125	59-139
VOA	Benzene	76-127	66-142

Appendix E

NJDEPE Deliverables Checklist

LABORATORY DELIVERABLES

THIS FORM MUST BE COMPLETED BY THE LABORATORY OR ENVIRONMENTAL CONSULTANT AND ACCOMPANY ALL DATA SUBMISSIONS

The following laboratory deliverables shall be included in the data submission. All deviations from the accepted methodology and procedures, or performance values outside acceptable ranges shall be summarized in the Non-Conformance Summary. Attachment 2 of the Draft ECRA Sampling Plan Guide (ESPG) provides further details to be followed. The document shall be bound and paginated, contain a table of contents, and all pages shall be legible. Incomplete packages will be returned or held without review until the data package is completed.

		Check if Complete
I.	Cover Page, Format, and Laboratory Certification (Include Cross Reference Table of Field I.D. # and Laboratory I.D. #)	____
II.	Chain of Custody	____
III.	Summary Sheets Listing Analytical Results Including QA Data Information (see Attached Form and ESPG Attachment 2.B.2.C.)	____
IV.	Laboratory Chronicle and Methodology Summary including Sampling Holding Time Check	____
V.	Initial Calibration and Continuing Calibration	____
VI.	Tune Summary (MS)	____
VII.	Blanks (Method, Field, Trip)	____
VIII.	Surrogate Recovery Summary	____
IX.	Chromatographs Labelled/Compound Identification	____
X.	Minimum Detection Limits (Lower than Action Level If Clean Zone Sample - and consistent with method guidelines)	____
XI.	Non-Conformance Summary	____

____

Laboratory Manager or Environmental Consultant's Signature

____

Date